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# 2013 IEEE Taxonomy

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### IEEE Taxonomy: A Subset Hierarchical Display of IEEE Thesaurus Terms

The IEEE Taxonomy comprises the first three hierarchical 'levels' under each term-family (or branch) that is formed from the top-most terms of the IEEE Thesaurus. In this document these term-families are arranged alphabetically and denoted by **boldface** type. Each term family's hierarchy goes to no more than three sublevels, denoted by indents (grouping of four dots) preceding the next level terms. A term can appear in more than one hierarchical branch and can appear more than once in any particular hierarchy. The IEEE Taxonomy is defined in this way so that it is always a subset of the IEEE Thesaurus.

#### **Aerospace and electronic systems**

....Aerospace control	.....Payloads
.....Air traffic control	.....Military satellites
.....Attitude control	.....Weapons
.....Ground support	.....Guns
....Aerospace engineering	.....Missiles
.....Aerospace biophysics	.....Nuclear weapons
.....Aerospace electronics	.....Projectiles
.....Aerospace safety	....Radar
.....Air safety	.....Airborne radar
.....Aerospace simulation	.....Bistatic radar
.....Aerospace testing	.....Doppler radar
.....Satellites	.....Ground penetrating radar
.....Artificial satellites	.....Laser radar
.....Earth Observing System	.....Meteorological radar
.....Low earth orbit satellites	.....Millimeter wave radar
.....Moon	.....Multistatic radar
.....Space stations	.....MIMO radar
.....Space technology	.....Passive radar
.....Space exploration	.....Radar applications
....Aerospace materials	.....Radar countermeasures
.....Aerospace components	.....Radar detection
....Aircraft manufacture	.....Radar imaging
....Aircraft navigation	.....Radar measurements
....Aircraft propulsion	.....Radar polarimetry
.....Propellers	.....Radar remote sensing
....Command and control systems	.....Radar tracking
....Electronic warfare	.....Radar clutter
.....Electronic countermeasures	.....Radar cross-sections
.....Jamming	.....Radar equipment
.....Radar countermeasures	.....Radar theory
....Military equipment	.....Spaceborne radar
.....Military aircraft	.....Spread spectrum radar
	.....Synthetic aperture radar

- .....Inverse synthetic aperture radar
- .....Polarimetric synthetic aperture radar
- .....Ultra wideband radar
- ....Sensor systems
- .....Gunshot detection systems
- ....Sonar
- .....Sonar applications
- .....Sonar detection
- .....Sonar measurements
- .....Sonar equipment
- .....Synthetic aperture sonar
- ....Telemetry
- .....Biomedical telemetry

### **Antennas and propagation**

- ....Antennas
- .....Antenna accessories
- .....Antenna arrays
- .....Adaptive arrays
- .....Butler matrices
- .....Linear antenna arrays
- .....Log periodic antennas
- .....Microstrip antenna arrays
- .....Microwave antenna arrays
- .....Phased arrays
- .....Planar arrays
- .....Antenna radiation patterns
- .....Near-field radiation pattern
- .....Antenna theory
- .....Frequency selective surfaces
- .....Apertures
- .....Aperture antennas
- .....Aperture coupled antennas
- .....Broadband antennas
- .....Ultra wideband antennas
- .....Vivaldi antennas
- .....Dielectric resonator antennas
- .....Dipole antennas
- .....Directional antennas
- .....Directive antennas
- .....Feeds
- .....Antenna feeds
- .....Fractal antennas
- .....Helical antennas
- .....Horn antennas

- .....Leaky wave antennas
- .....Loaded antennas
- .....Log-periodic dipole antennas
- .....Microstrip antennas
- .....Microwave antennas
- .....Mobile antennas
- .....Multifrequency antennas
- .....Omnidirectional antennas
- .....Patch antennas
- .....Radar antennas
- .....Receiving antennas
- .....Rectennas
- .....Reflector antennas
- .....Satellite antennas
- .....Slot antennas
- .....Transmission line antennas
- .....Transmitting antennas
- .....UHF antennas
- .....Yagi-Uda antennas
- ....Electromagnetic propagation
- .....Electromagnetic diffraction
- .....Optical diffraction
- .....Physical theory of diffraction
- .....X-ray diffraction
- .....Electromagnetic propagation in absorbing media
- .....Electromagnetic reflection
- .....Optical reflection
- .....Microwave propagation
- .....Millimeter wave propagation
- .....Optical propagation
- .....Optical surface waves
- .....Optical waveguides
- .....Propagation constant
- .....Propagation losses
- .....Radio propagation
- .....Radiowave propagation
- .....Submillimeter wave propagation
- .....UHF propagation
- ....Radio astronomy

### **Broadcast technology**

- ....Broadcasting
- .....Digital audio broadcasting
- .....Digital audio players

- .....Digital Radio Mondiale
- .....Digital multimedia broadcasting
- .....Digital video broadcasting
- .....Radio broadcasting
- .....Frequency modulation
- .....Radio networks
- .....Satellite broadcasting
- .....TV broadcasting

### **Circuits and systems**

- ....Circuits
  - .....Active circuits
    - .....Active inductors
    - .....Gyrators
    - .....Operational amplifiers
  - .....Adders
  - .....Analog circuits
    - .....Analog integrated circuits
    - .....Analog processing circuits
  - .....Application specific integrated circuits
    - .....System-on-chip
  - .....Asynchronous circuits
  - .....Bipolar integrated circuits
    - .....BiCMOS integrated circuits
  - .....Bipolar transistor circuits
    - .....Bipolar integrated circuits
  - .....Bistable circuits
    - .....Latches
  - .....Bridge circuits
  - .....Charge pumps
  - .....Circuit analysis
    - .....Circuit analysis computing
    - .....Coupled mode analysis
    - .....Nonlinear network analysis
  - .....Circuit faults
    - .....Electrical fault detection
  - .....Circuit noise
    - .....Thermal noise
  - .....Circuit simulation
  - .....Circuit synthesis
    - .....High level synthesis
    - .....Integrated circuit synthesis
  - .....Coproductors
  - .....Counting circuits
  - .....Coupling circuits

- .....Digital circuits
  - .....Circuit topology
  - .....Digital integrated circuits
  - .....Digital signal processors
  - .....Distributed parameter circuits
  - .....Driver circuits
  - .....Electronic circuits
    - .....Breadboard circuit
    - .....Central Processing Unit
    - .....Stripboard circuit
  - .....Equivalent circuits
  - .....Feedback
    - .....Feedback circuits
    - .....Negative feedback
    - .....Neurofeedback
  - .....Hybrid integrated circuits
  - .....Integrated circuits
    - .....Analog-digital integrated circuits
    - .....Analog integrated circuits
    - .....Application specific integrated circuits
    - .....Bipolar integrated circuits
    - .....CMOS integrated circuits
    - .....Coproductors
    - .....Current-mode circuits
    - .....Digital integrated circuits
    - .....FET integrated circuits
    - .....Field programmable gate arrays
    - .....Hybrid integrated circuits
    - .....Integrated circuit interconnections
    - .....Integrated circuit modeling
    - .....Integrated circuit noise
    - .....Integrated circuit synthesis
    - .....Large scale integration
    - .....MESFET integrated circuits
    - .....Microprocessors
    - .....Microwave integrated circuits
    - .....Millimeter wave integrated circuits
    - .....Mixed analog digital integrated circuits
    - .....Monolithic integrated circuits
    - .....Photonic integrated circuits
    - .....Power integrated circuits
    - .....Radiofrequency integrated circuits
    - .....Submillimeter wave integrated circuits
    - .....Superconducting integrated circuits
    - .....Thick film circuits
    - .....Thin film circuits
    - .....Three-dimensional integrated circuits

.....Through-silicon vias  
 .....UHF integrated circuits  
 .....Ultra large scale integration  
 .....Very high speed integrated circuits  
 .....Very large scale integration  
 .....Wafer scale integration  
 .....Isolators  
 .....Large scale integration  
 .....Ultra large scale integration  
 .....Very large scale integration  
 .....Wafer scale integration  
 .....Linear circuits  
 .....Logic arrays  
 .....Programmable logic arrays  
 .....Logic circuits  
 .....Combinational circuits  
 .....Logic arrays  
 .....Programmable logic arrays  
 .....Superconducting logic circuits  
 .....Magnetic circuits  
 .....Microprocessors  
 .....Automatic logic units  
 .....Biomimetics  
 .....Coprocessors  
 .....Microcontrollers  
 .....Microprocessor chips  
 .....Vector processors  
 .....Microwave circuits  
 .....Millimeter wave circuits  
 .....Millimeter wave integrated circuits  
 .....Millimeter wave integrated circuits  
 .....MIMICs  
 .....Monolithic integrated circuits  
 .....MIMICs  
 .....MMICs  
 .....MOSFET circuits  
 .....CMOSFET circuits  
 .....MOS integrated circuits  
 .....Power MOSFET  
 .....Multiplying circuits  
 .....Nonlinear circuits  
 .....Nonlinear network analysis  
 .....Passive circuits  
 .....Phase shifters  
 .....Phase transformers  
 .....Power dissipation  
 .....Power integrated circuits  
 .....Printed circuits  
 .....Flexible printed circuits  
 .....Programmable circuits  
 .....Field programmable analog arrays  
 .....Programmable logic arrays  
 .....Programmable logic devices  
 .....Programmable logic arrays  
 .....Programmable logic devices  
 .....Pulse circuits  
 .....Flip-flops  
 .....Radiation detector circuits  
 .....Rail to rail operation  
 .....Rail to rail amplifiers  
 .....Rail to rail inputs  
 .....Rail to rail outputs  
 .....Rectifiers  
 .....RLC circuits  
 .....Sampled data circuits  
 .....Sequential circuits  
 .....Silicon-on-insulator  
 .....Silicon on sapphire  
 .....Submillimeter wave circuits  
 .....Submillimeter wave integrated circuits  
 .....Summing circuits  
 .....Switched circuits  
 .....Switched capacitor circuits  
 .....Switching circuits  
 .....Choppers (circuits)  
 .....Logic circuits  
 .....Switching converters  
 .....Zero current switching  
 .....Zero voltage switching  
 .....Thick film circuits  
 .....Thin film circuits  
 .....Thyristor circuits  
 .....Time varying circuits  
 .....Trigger circuits  
 .....UHF circuits  
 .....UHF integrated circuits  
 .....UHF integrated circuits  
 .....Ultra large scale integration  
 .....Very large scale integration  
 .....Neuromorphics  
 .....Wafer scale integration  
 .....VHF circuits  
 .....Wafer scale integration  
 .....Contacts

- .....Brushes
- .....Contact resistance
- .....Ohmic contacts
- ....Filtering
- .....Filters
- .....Active filters
- .....Anisotropic
- .....Bragg gratings
- .....Channel bank filters
- .....Digital filters
- .....Equalizers
- .....Filtering theory
- .....Gabor filters
- .....Harmonic filters
- .....IIR filters
- .....Kalman filters
- .....Low-pass filters
- .....Matched filters
- .....Microstrip filters
- .....Nonlinear filters
- .....Particle filters
- .....Power filters
- .....Resonator filters
- .....Spatial filters
- .....Superconducting filters
- .....Transversal filters
- .....Information filtering
- .....Information filters
- .....Recommender systems
- ....Integrated circuit technology
- .....CMOS technology
- .....CMOS process
- .....Silicon on sapphire
- .....Moore's Law
- ....Logic devices
- .....Logic gates
- .....Programmable logic devices
- ....Oscillators
- .....Digital-controlled oscillators
- .....Injection-locked oscillators
- .....Local oscillators
- .....Microwave oscillators
- .....Phase noise
- .....Ring oscillators
- .....Voltage-controlled oscillators
- ....Single electron devices
- .....Single electron memory

- .....Hetero-nanocrystal memory
- .....Single electron transistors
- ....Tunable circuits and devices
- .....RLC circuits
- .....Tuned circuits

### **Communications technology**

- ....Communication equipment
- .....Auditory displays
- .....Codecs
- .....Speech codecs
- .....Video codecs
- .....Modems
- .....Optical communication equipment
- .....Optical transmitters
- .....Radio communication equipment
- .....Base stations
- .....Ham radios
- .....Land mobile radio equipment
- .....Radio transceivers
- .....Transponders
- .....Receivers
- .....Optical receivers
- .....RAKE receivers
- .....Receiving antennas
- .....Repeaters
- .....Speech codecs
- .....Telephone equipment
- .....Cellular phones
- .....Telephone sets
- .....Vocoders
- .....Transceivers
- .....Radio transceivers
- .....Transmitters
- .....Auxiliary transmitters
- .....Diversity methods
- .....Neurotransmitters
- .....Optical transmitters
- .....Radio transmitters
- .....Transmitting antennas
- .....Transponders
- .....TV equipment
- .....Large screen displays
- .....TV receivers
- .....Video codecs

- .....Video equipment
- .....Video codecs
- .....Vocoders
- ....Communication switching
- .....Code division multiplexing
- .....Electronic switching systems
- .....Frame relay
- .....Handover
- .....Multiprotocol label switching
- .....Packet switching
- .....Burst switching
- .....Frame relay
- .....Multiprotocol label switching
- .....Packet loss
- ....Communication systems
- .....ARPANET
- .....Biomedical communication
- .....Biomedical telemetry
- .....Telemedicine
- .....Broadband communication
- .....B-ISDN
- .....Broadband amplifiers
- .....Communication networks
- .....Central office
- .....Cyberspace
- .....Communication system control
- .....Telecommunication control
- .....Communication system security
- .....Radio communication countermeasures
- .....Communication system signaling
- .....Communication system software
- .....Streaming media
- .....Communication system traffic
- .....Communication system traffic control
- .....Computer networks
- .....Ad hoc networks
- .....Computer network management
- .....Content distribution networks
- .....Cyberspace
- .....Diffserv networks
- .....Domain Name System
- .....Ethernet networks
- .....Google
- .....Internet
- .....Intserv networks
- .....IP networks
- .....Metropolitan area networks
- .....Multiprocessor interconnection networks
- .....Network servers
- .....Next generation networking
- .....Overlay networks
- .....Peer-to-peer computing
- .....Storage area networks
- .....Token networks
- .....Unicast
- .....Virtual private networks
- .....Wide area networks
- .....Cross layer design
- .....Data buses
- .....Backplanes
- .....Data communication
- .....Asynchronous communication
- .....Asynchronous transfer mode
- .....Data buses
- .....Data transfer
- .....Telecommunication buffers
- .....Telemetry
- .....Teleprinting
- .....Digital communication
- .....Baseband
- .....DICOM
- .....Digital audio broadcasting
- .....Digital images
- .....Digital multimedia broadcasting
- .....Digital video broadcasting
- .....DSL
- .....ISDN
- .....Passband
- .....Portable media players
- .....SONET
- .....Spread spectrum communication
- .....Facsimile
- .....FDDI
- .....Indoor communication
- .....Indoor environments
- .....Internet
- .....Instant messaging
- .....Internet telephony
- .....Internet topology
- .....Middleboxes
- .....Semantic Web
- .....Web 2.0
- .....Web services

.....IP networks	.....Optical interconnections
.....TCPIP	.....Optical packet switching
.....ISDN	.....Optical wavelength conversion
.....B-ISDN	.....Scheduling algorithms
.....Land mobile radio cellular systems	.....SONET
.....Cellular networks	.....Personal communication networks
.....Paging strategies	.....Protocols
.....Local area networks	.....Access protocols
.....Wireless LAN	.....Asynchronous transfer mode
.....Metropolitan area networks	.....Cryptographic protocols
.....Microwave communication	.....Master-slave
.....Rectennas	.....Multicast protocols
.....Military communication	.....Multiprotocol label switching
.....Reconnaissance	.....Routing protocols
.....Millimeter wave communication	.....Transport protocols
.....MIMO	.....Wireless application protocol
.....Rician channels	.....Quality of service
.....Mobile communication	.....Admission control
.....3G mobile communication	.....Radio communication
.....4G mobile communication	.....Baseband
.....Ambient networks	.....Bluetooth
.....Dual band	.....Indoor radio communication
.....Land mobile radio	.....Land mobile radio
.....Land mobile radio cellular systems	.....Land mobile radio cellular systems
.....Mobile nodes	.....Packet radio networks
.....Mobile radio mobility management	.....Passband
.....Software radio	.....Personal area networks
.....Molecular communication	.....Radio broadcasting
.....Multiaccess communication	.....Radio communication countermeasures
.....Direct-sequence code-division multiple access	.....Radio frequency
.....Frequency division multiaccess	.....Radio link
.....Multicarrier code division multiple access	.....Radio spectrum management
.....Subscriber loops	.....Satellite communication
.....Time division multiple access	.....Satellite ground stations
.....Time division synchronous code division multiple access	.....Software radio
.....Multicast communication	.....Zigbee
.....Multicast VPN	.....Routing
.....Multimedia communication	.....Wavelength routing
.....Narrowband	.....Satellite communication
.....Optical fiber communication	.....Downlink
.....FDDI	.....Satellite broadcasting
.....Optical buffering	.....Satellite ground stations
.....Optical fiber networks	.....Uplink
.....Optical fiber subscriber loops	.....Satellite ground stations
	.....Spatial diversity
	.....Submillimeter wave communication
	.....Subscriber loops



- .....Switching systems
  - .....Electronic switching systems
    - .....Switching frequency
    - .....Switching loss
  - .....Telecommunication switching
    - .....Synchronous digital hierarchy
  - .....Telecommunications
    - .....Ambient intelligence
    - .....Feedback communications
    - .....IP networks
    - .....Radio access networks
    - .....Railway communication
    - .....Telecommunication computing
    - .....Telecommunication network topology
    - .....Telecommunication services
    - .....Telematics
    - .....Teleconferencing
    - .....Telegraphy
    - .....Telephony
    - .....Teleprinting
    - .....Teletext
    - .....Token networks
    - .....UHF communication
    - .....Underwater communication
    - .....Videophone systems
    - .....Videotex
    - .....Visual communication
    - .....Wide area networks
    - .....Wideband
    - .....Wireless communication
      - .....Cognitive radio
      - .....GSM
        - .....Open wireless architecture
        - .....Roaming
        - .....Spatial diversity
        - .....WiMAX
        - .....Wireless application protocol
        - .....Wireless networks
        - .....Wireless mesh networks
        - .....Wireless sensor networks
          - .....Body sensor networks
            - .....Event detection
    - .....Couplers
      - .....Directional couplers
    - .....High-speed electronics
      - .....High-speed integrated circuits
      - .....High-speed networks
  - .....Ultrafast electronics
    - ....Image communication
      - .....Facsimile
      - .....Picture archiving and communication systems
        - ....Message systems
          - .....Electronic mail
            - .....Unified messaging
            - .....Unsolicited electronic mail
          - .....Electronic messaging
            - .....Instant messaging
            - .....Unified messaging
          - .....Postal services
          - .....Publish subscribe systems
          - .....Voice mail
        - ....Modulation
          - .....Amplitude modulation
            - .....Amplitude shift keying
            - .....Quadrature amplitude modulation
          - .....Chirp modulation
          - .....Demodulation
          - .....Digital modulation
            - .....Constellation diagram
              - .....Partial response signaling
            - .....Frequency modulation
              - .....Frequency shift keying
            - .....Magnetic modulators
            - .....Modulation coding
              - .....Interleaved codes
            - .....Optical modulation
              - .....Electrooptic modulators
                - .....Intensity modulation
              - .....Phase modulation
                - .....Continuous phase modulation
                - .....Differential phase shift keying
                - .....Phase shift keying
            - .....Pulse modulation
              - .....Pulse width modulation
                - .....Pulse width modulation inverters
                  - .....Space vector pulse width modulation
          - ....Multiplexing
            - .....Code division multiplexing
            - .....Demultiplexing
            - .....Frequency division multiplexing
              - .....Multiplexing equipment
                - .....Add-drop multiplexers
            - .....OFDM

- .....Multiple access interference
  - .....OFDM modulation
  - .....Partial transmit sequences
  - .....Peak to average power ratio
  - .....Time division multiplexing
  - .....Wavelength division multiplexing
  - .....WDM networks
  - ....Network topology
  - .....Complex networks
  - .....Computer network reliability
  - ....Presence network agents
  - ....TV
  - .....Cable TV
  - .....Digital TV
  - .....Analog TV
  - .....HDTV
  - .....IPTV
  - .....Mobile TV
  - .....Three-dimensional television
  - ....UHF technology
  - .....UHF antennas
  - .....UHF circuits
  - .....UHF integrated circuits
  - .....UHF communication
  - .....UHF devices
  - .....UHF integrated circuits
  - ....Ultra wideband technology
  - .....Ultra wideband antennas
  - .....Ultra wideband communication
  - .....Ultra wideband radar
  - ....VHF devices
  - .....Diode lasers
  - .....Electrodes
  - .....Anodes
  - .....Cathodes
  - .....Microelectrodes
  - .....Fuses
  - .....Inductors
  - .....Active inductors
  - .....Thick film inductors
  - .....Thin film inductors
  - .....Resistors
  - .....Memristors
  - .....Switched capacitor networks
  - .....Varistors
  - .....Structural plates
  - .....Switches
  - .....Contactors
  - .....Microswitches
  - .....Optical switches
  - .....Transducers
  - .....Acoustic transducers
  - .....Biomedical transducers
  - .....Chemical transducers
  - .....Piezoelectric transducers
  - .....Ultrasonic transducer arrays
  - ....Electronic equipment manufacture
  - .....Damascene integration
  - .....Micromachining
  - .....Radiation hardening (electronics)
  - .....Semiconductor device manufacture
  - .....Diffusion processes
  - .....Flip-chip devices
  - .....High-K gate dielectrics
  - .....Quasi-doping
  - .....Semiconductor device doping
  - .....Semiconductor epitaxial layers
  - .....Semiconductor growth
  - .....Silicidation
  - .....Wafer bonding
  - ....Electronics packaging
  - .....Chip scale packaging
  - ....Environmentally friendly manufacturing techniques
  - ....Integrated circuit manufacture
  - .....Surface-mount technology
  - ....Integrated circuit packaging
  - .....Multichip modules
- Components, packaging, and manufacturing technology**
- ....Component architectures
  - ....Electronic components
  - .....Capacitors
  - .....Power capacitors
  - .....Varactors
  - .....Coils
  - .....Superconducting coils
  - .....Connectors
  - .....Plugs
  - .....Sockets
  - .....Diodes

- .....Plastic integrated circuit packaging
- ....Semiconductor device packaging
- ....Thermal management of electronics
- .....Electronic packaging thermal management
- .....Electronics cooling

### **Computational and artificial intelligence**

- ....Artificial intelligence
  - .....Context awareness
  - .....Cooperative systems
  - .....Decision support systems
  - .....Intelligent systems
    - .....Intelligent robots
    - .....Knowledge based systems
    - .....Expert systems
    - .....Mobile agents
    - .....Knowledge engineering
    - .....Inference mechanisms
    - .....Knowledge acquisition
    - .....Knowledge discovery
    - .....Knowledge representation
  - .....Learning (artificial intelligence)
    - .....Distance learning
    - .....Electronic learning
    - .....Learning systems
      - .....Backpropagation
      - .....Learning automata
      - .....Semisupervised learning
      - .....Supervised learning
      - .....Unsupervised learning
    - .....Machine learning
      - .....Boosting
      - .....Statistical learning
      - .....Prediction methods
        - .....Linear predictive coding
        - .....Predictive coding
        - .....Predictive encoding
        - .....Predictive models
  - ....Autonomous mental development
  - ....Computational intelligence
    - .....Computation theory
      - .....Computational complexity
      - .....Concurrent computing
      - .....Greedy algorithms

- .....Support vector machines
- .....Evolutionary computation
  - .....Particle swarm optimization
- .....Fuzzy systems
  - .....Fuzzy control
  - .....Fuzzy neural networks
  - .....Hybrid intelligent systems
- .....Genetic algorithms
- ....Logic
  - .....Fuzzy logic
    - .....Fuzzy cognitive maps
    - .....Takagi-Sugeno model
  - .....Multivalued logic
  - .....Probabilistic logic
  - .....Sufficient conditions
- ....Machine intelligence
  - .....Pattern analysis
- ....Neural networks
  - .....Artificial neural networks
    - .....Hebbian theory
    - .....Self-organizing feature maps
  - .....Biological neural networks
  - .....Cellular neural networks
  - .....Feedforward neural networks
    - .....Multilayer perceptrons
    - .....Multi-layer neural network
  - .....Neural network hardware
  - .....Radial basis function networks
  - .....Recurrent neural networks
  - .....Hopfield neural networks

### **Computers and information processing**

- ....Computer applications
  - .....Affective computing
  - .....Application virtualization
  - .....Computer aided analysis
  - .....Computer aided engineering
  - .....Computer aided instruction
  - .....Computer generated music
  - .....Computer integrated manufacturing
  - .....Control engineering computing
  - .....High energy physics instrumentation computing
  - .....Linear particle accelerator
  - .....Knowledge management

|   |  |
|---|--|
| .....Knowledge transfer                 | .....Browsers                                |
| .....Medical information systems        | .....Field buses                             |
| .....Electronic medical records         | .....Firewire                                |
| .....Military computing                 | .....Haptic interfaces                       |
| .....Physics computing                  | .....Data gloves                             |
| .....Power engineering computing        | .....Force feedback                          |
| .....Power system analysis computing    | .....Grasping                                |
| .....Publishing                         | .....Hypertext systems                       |
| .....Bibliometrics                      | .....Interface phenomena                     |
| .....Company reports                    | .....Network interfaces                      |
| .....Desktop publishing                 | .....Interface states                        |
| .....Electronic publishing              | .....Musical instrument digital interfaces   |
| .....Scientific publishing              | .....Ports (Computers)                       |
| .....Scientific computing               | .....System buses                            |
| .....Telecommunication computing        | ....Computer networks                        |
| .....Internetworking                    | .....Ad hoc networks                         |
| .....Soft switching                     | .....Mesh networks                           |
| .....Virtual enterprises                | .....Mobile ad hoc networks                  |
| .....Virtual manufacturing              | .....Vehicular ad hoc networks               |
| .....Virtual machining                  | .....Computer network management             |
| .....Web sites                          | .....Computer network reliability            |
| .....Facebook                           | .....Disruption tolerant networking          |
| .....MySpace                            | .....Middleboxes                             |
| .....Uniform resource locators          | .....Network address translation             |
| .....Web design                         | .....Network synthesis                       |
| .....YouTube                            | .....Content distribution networks           |
| .....World Wide Web                     | .....Cyberspace                              |
| .....Mashups                            | .....Diffserv networks                       |
| ....Computer architecture               | .....Domain Name System                      |
| .....Accelerator architectures          | .....Ethernet networks                       |
| .....Data structures                    | .....EPON                                    |
| .....Arrays                             | .....Google                                  |
| .....Binary decision diagrams           | .....Internet                                |
| .....Null value                         | .....Instant messaging                       |
| .....Octrees                            | .....Internet telephony                      |
| .....Table lookup                       | .....Internet topology                       |
| .....Tree data structures               | .....Middleboxes                             |
| .....Dynamic voltage scaling            | .....Semantic Web                            |
| .....Memory architecture                | .....Web 2.0                                 |
| .....Memory management                  | .....Web services                            |
| .....Multiprocessor interconnection     | .....Intserv networks                        |
| .....Hypercubes                         | .....IP networks                             |
| .....Parallel architectures             | .....TCPIP                                   |
| .....Multicore processing               | .....Metropolitan area networks              |
| .....Reconfigurable architectures       | .....Multiprocessor interconnection networks |
| ....Computer interfaces                 | .....Network servers                         |
| .....Application programming interfaces | .....Next generation networking              |

.....Overlay networks  
 .....Peer-to-peer computing  
 .....Storage area networks  
 .....Token networks  
 .....Unicast  
 .....Virtual private networks  
 .....Extranets  
 .....Wide area networks  
 ....Computer performance  
 .....Computer errors  
 .....Computer crashes  
 .....Performance loss  
 ....Computer peripherals  
 .....Disk drives  
 .....Keyboards  
 .....Modems  
 .....Printers  
 ....Computers  
 .....Analog computers  
 .....Calculators  
 .....Difference engines  
 .....Microcomputers  
 .....Portable computers  
 .....Workstations  
 .....Parallel machines  
 .....Supercomputers  
 .....Tablet computers  
 .....Wearable computers  
 ....Computer science  
 .....Formal languages  
 .....Computer languages  
 .....Runtime library  
 .....Network theory (graphs)  
 .....Programming  
 .....Augmented reality  
 .....Automatic programming  
 .....Concatenated codes  
 .....Functional programming  
 .....Granular computing  
 .....Integer linear programming  
 .....Logic programming  
 .....Microprogramming  
 .....Object oriented methods  
 .....Object oriented programming  
 .....Opportunistic software systems  
 development  
 .....Parallel programming  
 .....Performance analysis  
 .....Programming profession  
 .....Robot programming  
 ....Concurrency control  
 .....Processor scheduling  
 .....Scheduling algorithms  
 ....Database machines  
 ....Data systems  
 .....Data acquisition  
 .....Fastbus  
 .....User-generated content  
 .....Data compression  
 .....Adaptive coding  
 .....Audio compression  
 .....Huffman coding  
 .....Source coding  
 .....Test data compression  
 .....Transform coding  
 .....Data conversion  
 .....Analog-digital conversion  
 .....Digital-analog conversion  
 .....Data engineering  
 .....Data handling  
 .....Data assimilation  
 .....Data encapsulation  
 .....Document handling  
 .....Merging  
 .....Sorting  
 .....Data processing  
 .....Associative processing  
 .....Data analysis  
 .....Data collection  
 .....Data integration  
 .....Data preprocessing  
 .....Data transfer  
 .....Information exchange  
 .....Spreadsheet programs  
 .....Text processing  
 .....Virtual enterprises  
 .....Data storage systems  
 .....Data warehouses  
 ....Digital systems  
 .....Internet  
 .....Instant messaging  
 .....Internet telephony  
 .....Internet topology  
 .....Middleboxes

|                                      |   |
|--------------------------------------|---|
| .....Semantic Web                    | .....Image color analysis               |
| .....Web 2.0                         | .....Image decomposition                |
| .....Web services                    | .....Image denoising                    |
| .....ISDN                            | .....Image enhancement                  |
| .....B-ISDN                          | .....Image fusion                       |
| .....Local area networks             | .....Image generation                   |
| .....Wireless LAN                    | .....Plasma displays                    |
| .....Metropolitan area networks      | .....Visual effects                     |
| .....Token networks                  | .....Image recognition                  |
| ....Distributed computing            | .....Image edge detection               |
| .....Client-server systems           | .....Image reconstruction               |
| .....Middleware                      | .....Image registration                 |
| .....Servers                         | .....Image representation               |
| .....Collaborative work              | .....Image resolution                   |
| .....Diffserv networks               | .....High-resolution imaging            |
| .....Distributed databases           | .....Spatial resolution                 |
| .....Distributed information systems | .....Image restoration                  |
| .....Publish-subscribe               | .....Image sampling                     |
| .....Internet                        | .....Image segmentation                 |
| .....Instant messaging               | .....Image sequences                    |
| .....Internet telephony              | .....Image texture                      |
| .....Internet topology               | .....Machine vision                     |
| .....Middleboxes                     | .....Object recognition                 |
| .....Semantic Web                    | .....Object segmentation                |
| .....Web 2.0                         | .....Morphological operations           |
| .....Web services                    | .....Optical feedback                   |
| .....Metacomputing                   | .....Smart pixels                       |
| .....Grid computing                  | .....Spatial coherence                  |
| .....Peer-to-peer computing          | .....Table lookup                       |
| ....DNA computing                    | ....Memory                              |
| ....File servers                     | .....Analog memory                      |
| ....Hardware                         | .....Associative memory                 |
| .....Open source hardware            | .....Buffer storage                     |
| ....High performance computing       | .....Computer buffers                   |
| ....Image processing                 | .....Cache memory                       |
| .....Active shape model              | .....Cache storage                      |
| .....Feature extraction              | .....Content addressable storage        |
| .....Gray-scale                      | .....Flash memories                     |
| .....Image analysis                  | .....Flash memory cells                 |
| .....Image classification            | .....Magnetic memory                    |
| .....Image motion analysis           | .....Floppy disks                       |
| .....Image quality                   | .....Hard disks                         |
| .....Image sequence analysis         | .....Memory management                  |
| .....Image texture analysis          | .....Nonvolatile memory                 |
| .....Object detection                | .....Nonvolatile single electron memory |
| .....Subtraction techniques          | .....Phase change memory                |
| .....Image coding                    | .....Phase change random access memory  |

|  |   |
|--|---|
| .....Random access memory              | .....Automatic speech recognition           |
| .....DRAM chips                        | .....Speech analysis                        |
| .....Phase change random access memory | .....Text recognition                       |
| .....SDRAM                             | ....Pervasive computing                     |
| .....SRAM cells                        | .....Ubiquitous computing                   |
| .....SRAM chips                        | .....Context-aware services                 |
| .....Read only memory                  | .....Wearable computers                     |
| .....PROM                              | ....Petascale computing                     |
| .....Read-write memory                 | ....Platform virtualization                 |
| .....Registers                         | ....Quantum computing                       |
| .....Shift registers                   | .....Quantum cellular automata              |
| .....Scanning probe data storage       | ....Real-time systems                       |
| .....Semiconductor memory              | ....Software                                |
| ....Mobile computing                   | .....Application software                   |
| ....Molecular computing                | .....Embedded software                      |
| ....Multitasking                       | .....Middleware                             |
| .....Parametric study                  | .....Mediation                              |
| ....Open systems                       | .....Message-oriented middleware            |
| .....Physical layer                    | .....Web services                           |
| ....Optical computing                  | .....Open source software                   |
| ....Parallel processing                | .....Optical character recognition software |
| .....Multiprocessing systems           | .....Software agents                        |
| .....Data flow computing               | .....Autonomous agents                      |
| .....Processor scheduling              | .....Intelligent agents                     |
| .....Systolic arrays                   | .....Software as a service                  |
| .....Multithreading                    | .....Software debugging                     |
| .....Parallel algorithms               | .....Software design                        |
| .....Pipeline processing               | .....Software maintenance                   |
| ....Pattern recognition                | .....Software packages                      |
| .....Active shape model                | .....EMTDC                                  |
| .....Character recognition             | .....MATLAB                                 |
| .....Clustering methods                | .....PSCAD                                  |
| .....Pattern clustering                | .....SPICE                                  |
| .....Data mining                       | .....Software performance                   |
| .....Association rules                 | .....Software quality                       |
| .....Data privacy                      | .....Software reusability                   |
| .....Text analysis                     | .....Software safety                        |
| .....Text mining                       | .....Software systems                       |
| .....Web mining                        | .....Software tools                         |
| .....Face recognition                  | .....Authoring systems                      |
| .....Fingerprint recognition           | .....System software                        |
| .....Gesture recognition               | .....File systems                           |
| .....Handwriting recognition           | .....Operating systems                      |
| .....Forgery                           | .....Program processors                     |
| .....Pattern matching                  | .....Utility programs                       |
| .....Image matching                    | ....Software engineering                    |
| .....Speech recognition                | .....Capability maturity model              |

- .....Computer aided software engineering
- .....Formal verification
- .....Programming environments
- .....Reasoning about programs
- .....Runtime
  - .....Dynamic compiler
  - .....Runtime environment
- .....Software architecture
  - .....Client-server systems
  - .....Microarchitecture
  - .....Representational state transfer
- .....Software libraries
- ....System recovery
- .....Checkpointing
- .....Core dumps
- .....Debugging
- ....Time sharing computer systems
- ....Virtual machine monitors

### **Consumer electronics**

- ....Ambient intelligence
- ....Audio systems
  - .....Audio-visual systems
  - .....Auditory displays
  - .....Headphones
  - .....Loudspeakers
  - .....Microphones
    - .....Microphone arrays
  - .....Portable media players
  - .....Sonification
- ....Home automation
  - .....Portable media players
  - .....Refrigerators
  - .....Smart homes
  - .....Washing machines
- ....Home computing
- ....Low-power electronics
- ....Microwave ovens
- ....Multimedia systems
  - .....Multimedia communication
  - .....Multimedia computing
  - .....Multimedia databases

### **Control systems**

- ....Automatic control
- ....Automatic generation control
- ....Bidirectional control
- ....CAMAC
- ....Centralized control
- ....Closed loop systems
- ....Control design
- ....Control engineering
- ....Control equipment
  - .....Actuators
    - .....Electrostatic actuators
    - .....Hydraulic actuators
    - .....Intelligent actuators
    - .....Microactuators
    - .....Piezoelectric actuators
    - .....Pneumatic actuators
  - .....Fasteners
  - .....Microcontrollers
  - .....Regulators
  - .....Servosystems
    - .....Servomotors
  - .....Switches
    - .....Contactors
    - .....Microswitches
    - .....Optical switches
  - .....Switchgear
    - .....Circuit breakers
    - .....Interrupters
    - .....Relays
  - .....Telecontrol equipment
  - .....Thermostats
- ....Controllability
- ....Control system synthesis
- ....Decentralized control
  - .....Distributed parameter systems
- ....Delay systems
  - .....Added delay
  - .....Delay lines
- ....Digital control
  - .....Programmable control
    - .....Flow graphs
- ....Feedback
  - .....Feedback circuits
    - .....Output feedback
    - .....Negative feedback
    - .....Neurofeedback



- ....Fluid flow control
- ....Fluidics
  - .....Microfluidics
  - .....Nanofluidics
- ....Linear feedback control systems
  - .....Frequency locked loops
  - .....Phase locked loops
  - .....State feedback
  - .....Tracking loops
- ....Magnetic variables control
- ....Mechanical variables control
  - .....Displacement control
  - .....Force control
  - .....Level control
    - .....Gyroscopes
  - .....Motion control
    - .....Collision avoidance
    - .....Collision mitigation
    - .....Kinetic theory
    - .....Motion planning
    - .....Path planning
    - .....Visual servoing
  - .....Position control
    - .....Nanopositioning
  - .....Shape control
  - .....Size control
  - .....Strain control
  - .....Stress control
  - .....Thickness control
  - .....Torque control
  - .....Velocity control
    - .....Angular velocity control
  - .....Vibration control
  - .....Weight control
- ....Medical control systems
- ....Moisture control
  - .....Humidity control
- ....Motion compensation
- ....Networked control systems
- ....Nonlinear control systems
- ....Open loop systems
- ....Optical control
  - .....Lighting control
  - .....Optical variables control
- ....Optimal control
  - .....Bang-bang control
  - .....Infinite horizon

- ....PD control
- ....Pi control
- ....Pneumatic systems
- ....Pressure control
- ....Proportional control
- ....Radio control
- ....Robot control
  - .....Robot motion
- ....SCADA systems
- ....Sensorless control
- ....Sliding mode control
- ....Supervisory control
  - .....SCADA systems
- ....Thermal variables control
  - .....Temperature control
    - .....Cooling
    - .....Heating
  - .....Thermal analysis
  - .....Thermomechanical processes
- ....Traffic control
  - .....Queueing analysis

#### **Dielectrics and electrical insulation**

- ....Dielectrics
  - .....Dielectric constant
    - .....High-K gate dielectrics
  - .....Dielectric devices
    - .....Capacitors
    - .....Ferroelectric devices
    - .....Piezoelectric devices
    - .....Pyroelectric devices
  - .....Dielectric losses
  - .....Dielectric substrates
  - .....Dielectrophoresis
  - .....Electrohydrodynamics
  - .....Electrokinetics
  - .....Electrostriction
- ....Electric breakdown
  - .....Avalanche breakdown
  - .....Corona
  - .....Dielectric breakdown
    - .....Arc discharges
    - .....Discharges (electric)
    - .....Electrostatic discharges
    - .....Flashover

- .....Glow discharges
- .....Partial discharges
- .....Surface discharges
- .....Vacuum breakdown
- .....Sparks
- ....Insulation
  - .....Cable insulation
    - .....Power cable insulation
    - .....Ceramics
    - .....Porcelain
    - .....Gas insulation
      - .....Sulfur hexafluoride
    - .....Insulators
      - .....Metal-insulator structures
      - .....Plastic insulators
      - .....Rubber
        - .....Topological insulators
      - .....Trees - insulation
    - .....Isolation technology
      - .....Oil insulation
        - .....Oil filled cables
      - .....Plastic insulation

### Education

- ....Computer science education
- ....Continuing education
  - .....Education courses
- ....Educational institutions
- ....Educational technology
  - .....Computer aided instruction
  - .....Courseware
  - .....Electronic learning
- ....Engineering education
  - .....Biomedical engineering education
  - .....Communication engineering education
  - .....Control engineering education
  - .....Electrical engineering education
    - .....Electronics engineering education
  - .....Engineering students
  - .....Power engineering education
  - .....Student experiments
  - .....Systems engineering education
- ....Physics education
- ....Power engineering education
- ....Qualifications

- ....Training
  - .....Industrial training
  - .....Management training
  - .....On the job training
  - .....Vocational training

### Electromagnetic compatibility and interference

- ....Electromagnetic compatibility
  - .....Immunity testing
    - .....Reverberation chambers
- ....Electromagnetics
  - .....Electromagnetic analysis
    - .....Air gaps
      - .....Computational electromagnetics
      - .....Delay effects
      - .....Electromagnetic fields
      - .....Electromagnetic forces
      - .....Electromagnetic refraction
      - .....Permeability
      - .....Spark gaps
        - .....Time-domain analysis
      - .....Electromagnetic coupling
        - .....Mutual coupling
        - .....Optical coupling
      - .....Electromagnetic devices
        - .....Electromagnetic induction
          - .....Eddy currents
            - .....Inductive power transmission
      - .....Electromagnetic radiation
        - .....Correlators
        - .....Electromagnetic wave absorption
        - .....Frequency
          - .....Gamma-rays
            - .....Line-of-sight propagation
        - .....Electromagnetic shielding
          - .....Cable shielding
          - .....Magnetic shielding
        - .....Electromagnetic transients
          - .....EMP radiation effects
            - .....EMTDC
            - .....EMTP
              - .....Power system transients
                - .....Surges
                  - .....Proximity effects

- ....Interference
  - .....Clutter
  - .....Crosstalk
  - .....Diffraction
  - .....Echo interference
  - .....Electromagnetic interference
    - .....Radiofrequency interference
    - .....Specific absorption rate
  - .....Electromagnetic radiative interference
  - .....Electrostatic interference
    - .....Immunity testing
  - .....Interchannel interference
  - .....Interference cancellation
  - .....Interference channels
  - .....Interference constraints
  - .....Interference elimination
  - .....Interference suppression
  - .....Intersymbol interference
  - .....Rain fading
  - .....Terrain factors
  - .....TV interference

### **Electron devices**

- ....Cathode ray tubes
- ....Electron guns
- ....Electron multipliers
- ....Electron tubes
  - .....Field emitter arrays
  - .....Klystrons
  - .....Magnetrons
  - .....Thyratrons
- ....Mechatronics
  - .....Biomechatronics
- ....Microelectromechanical systems
  - .....Microelectromechanical devices
    - .....Microactuators
    - .....Micromotors
    - .....Micropumps
    - .....Microvalves
  - .....Radiofrequency microelectromechanical systems
- ....Microfluidics
- ....Micromechanical devices
  - .....Fluidic microsystems
- ....Photoelectricity

- .....Photovoltaic effects
  - .....Shunts (electrical)
- ....Photovoltaic cells
- ....Quantum computing
  - .....Quantum cellular automata
- ....Quantum well devices
  - .....Quantum well lasers
    - .....Quantum cascade lasers
  - .....Quantum wells
- .....Two dimensional hole gas
- ....Semiconductivity
  - ....Semiconductor devices
    - .....Flip-chip devices
    - .....Gunn devices
    - .....Hall effect devices
    - .....Junctions
      - .....Heterojunctions
      - .....Hybrid junctions
      - .....P-n junctions
      - .....Waveguide junctions
  - .....MIS devices
    - .....Charge coupled devices
    - .....MOS devices
    - .....MONOS devices
    - .....Piezoresistive devices
    - .....P-i-n diodes
  - .....Power semiconductor devices
    - .....Power transistors
    - .....Power semiconductor switches
      - .....Bipolar transistors
      - .....Thyristors
  - .....Quantum dots
  - .....Quantum well lasers
    - .....Quantum cascade lasers
  - .....Schottky diodes
  - .....Semiconductor counters
  - .....Semiconductor detectors
  - .....Semiconductor device modeling
  - .....Semiconductor device noise
  - .....Semiconductor diodes
    - .....P-i-n diodes
    - .....Schottky diodes
    - .....Semiconductor-metal interfaces
    - .....Superluminescent diodes
    - .....Varactors
  - .....Semiconductor-insulator interfaces
  - .....Semiconductor lasers

- .....Laser tuning
- .....Quantum dot lasers
- .....Quantum well lasers
- .....Semiconductor laser arrays
- .....Semiconductor optical amplifiers
- .....Surface emitting lasers
- .....Semiconductor waveguides
- .....Silicon devices
- .....SONOS devices
- .....Superluminescent diodes
- .....Surface emitting lasers
- .....Vertical cavity surface emitting lasers
- .....Thermistors
- .....Transistors
- .....Field effect transistors
- .....Heterojunction bipolar transistors
- .....Millimeter wave transistors
- .....Phototransistors
- ....Single electron devices
- .....Single electron memory
- .....Hetero-nanocrystal memory
- .....Single electron transistors
- ....Thick film devices
- .....Thick film inductors
- ....Thin film devices
- .....Film bulk acoustic resonators
- .....Thin film inductors
- .....Thin film transistors
- .....Organic thin film transistors
- ....Tunneling
- .....Gate leakage
- .....Josephson effect
- .....Magnetic tunneling
- .....Resonant tunneling devices
- .....Tunneling magnetoresistance
- ....Vacuum technology
- .....Photomultipliers
- .....Vacuum systems
- .....Gettering

#### **Electronic design automation and methodology**

- ....Design automation
- .....CAD/CAM
- .....Logic design

- .....Reconfigurable logic
- .....PSCAD
- ....Design methodology
- .....Design for disassembly
- .....Design for experiments
- .....Design for manufacture
- .....Design for quality
- .....Design for testability
- .....Graphics
- .....Animation
- .....Art
- .....Character generation
- .....Computer graphics
- .....Engineering drawings
- .....Layout
- .....Shape
- .....Symbols
- .....Virtual reality
- .....Visualization
- .....Green design
- .....Ecodesign
- .....Process design
- .....Pattern formation
- .....Product design
- .....Prototypes
- .....Technical drawing
- .....Time to market
- .....User centered design
- .....Virtual prototyping

#### **Engineering - general**

- ....Acoustical engineering
- ....Agricultural engineering
- ....Chemical engineering
- ....Civil engineering
- .....Railway engineering
- .....Railway safety
- .....Structural engineering
- .....Offshore installations
- ....Concurrent engineering
- ....Design engineering
- ....Electrical engineering
- .....Electrical engineering computing
- ....Engineering profession
- ....Maintenance engineering

- .....Predictive maintenance
  - .....Preventive maintenance
  - .....Condition monitoring
  - ....Mechanical engineering
    - .....Mechanical power transmission
    - .....Torque converters
    - .....Mechanical systems
    - .....Mechanical energy
    - .....Micromechanical devices
  - ....Precision engineering
  - ....Production engineering
    - .....Production planning
    - .....Capacity planning
    - .....Materials requirements planning
    - .....Process planning
  - ....Research and development
  - ....Reverse engineering
  - ....Sanitary engineering
  - ....Standardization
    - .....Formal specifications
    - .....Guidelines
    - .....Standards
      - .....ANSI standards
      - .....Code standards
      - .....Communication standards
      - .....IEC standards
      - .....IEEE standards
      - .....ISO standards
      - .....Measurement standards
      - .....Military standards
      - .....Software standards
      - .....Standards activities board
      - .....Standards organizations
      - .....Telecommunication standards
      - .....Universal Serial Bus
  - ....Thermal engineering
- Engineering in medicine and biology**
- ....Bioinformatics
  - ....Biology
    - .....Biochemistry
      - .....Amino acids
      - .....Biochemical analysis
      - .....Peptides
      - .....Proteins
    - .....Biodiversity
    - .....Biogeography
    - .....Bioelectric phenomena
    - .....Electric shock
    - .....Biological cells
      - .....Cells (biology)
      - .....Chromosome mapping
      - .....Fibroblasts
      - .....RNA
      - .....Stem cells
    - .....Biological information theory
    - .....Biological processes
    - .....Biological interactions
    - .....Chronobiology
    - .....Circadian rhythm
    - .....Coagulation
    - .....Symbiosis
    - .....Biological system modeling
    - .....Biological systems
      - .....Anatomy
      - .....Molecular communication
      - .....Organisms
    - .....Biology computing
    - .....Biophotonics
    - .....Biophysics
      - .....Aerospace biophysics
      - .....Biomagnetics
      - .....Cellular biophysics
      - .....Molecular biophysics
    - .....Evolution (biology)
    - .....Memetics
    - .....Phylogeny
    - .....Genetics
      - .....DNA
      - .....Gene therapy
      - .....Genetic communication
      - .....Genetic expression
      - .....Genetic programming
      - .....Genomics
    - .....Microinjection
    - .....Nanobioscience
      - .....DNA computing
      - .....Nanobiotechnology
    - .....Physiology
    - .....Predator prey systems
    - .....Synthetic biology
    - .....Systematics

.....Systems biology  
 .....Vegetation  
 .....Crops  
 .....Marine vegetation  
 .....Zoology  
 .....Animals  
 ....Biomedical communication  
 .....Biomedical telemetry  
 .....Telemedicine  
 ....Biomedical computing  
 .....Biomedical informatics  
 .....Medical expert systems  
 .....Medical information systems  
 .....Electronic medical records  
 ....Biomedical engineering  
 .....Bioimpedance  
 .....Biological techniques  
 .....Biomedical applications of radiation  
 .....Biomedical electronics  
 .....Biomedical signal processing  
 .....Biomedical image processing  
 .....Biotechnology  
 .....Cloning  
 .....Drug delivery  
 .....Targeted drug delivery  
 .....Neural engineering  
 .....Neural microtechnology  
 .....Neural nanotechnology  
 .....Neural prosthesis  
 .....Protein engineering  
 .....Tissue engineering  
 .....Regeneration engineering  
 ....Biomedical equipment  
 .....Assistive technology  
 .....Assistive devices  
 .....Wheelchairs  
 .....Biomedical electrodes  
 .....Biomedical telemetry  
 .....Biomedical transducers  
 .....Catheters  
 .....Cybercare  
 .....Endoscopes  
 .....Gerontechnology  
 .....Hypodermic needles  
 .....Implantable biomedical devices  
 .....Implants  
 .....Auditory implants  
 .....Brainstem implants  
 .....Cochlear implants  
 .....Microelectronic implants  
 .....Intracranial pressure sensors  
 .....Lithotriptors  
 .....Pacemakers  
 .....Stethoscope  
 .....Surgical instruments  
 .....Laparoscopes  
 ....Biomedical imaging  
 .....Angiocardiology  
 .....Angiography  
 .....Biomedical optical imaging  
 .....Cardiology  
 .....Echocardiography  
 .....Electrocardiography  
 .....Phonocardiography  
 .....DICOM  
 .....Encephalography  
 .....Mammography  
 .....Medical diagnostic imaging  
 .....Anatomical structure  
 .....Molecular imaging  
 .....Phantoms  
 ....Bionanotechnology  
 ....Bioterrorism  
 ....Computational biology  
 .....Computational biochemistry  
 .....Computational biophysics  
 .....Computational systems biology  
 ....Genetic engineering  
 ....Medical services  
 .....Catheterization  
 .....Clinical diagnosis  
 .....Cybercare  
 .....Health information management  
 .....Hospitals  
 .....In vitro  
 .....In vitro fertilization  
 .....In vivo  
 .....Medical conditions  
 .....Aneurysm  
 .....Arteriosclerosis  
 .....Arthritis  
 .....Atrophy  
 .....Blindness  
 .....Cancer

|                                       |   |
|---------------------------------------|---|
| .....Deafness                         | .....Hospitals                                      |
| .....Diabetes                         | .....Hyperthermia                                   |
| .....Diseases                         | .....Lithotripsy                                    |
| .....Epilepsy                         | .....Magnetic stimulation                           |
| .....Hemorrhaging                     | .....Neonatology                                    |
| .....Hypertension                     | .....Neuromuscular stimulation                      |
| .....Hyperthermia                     | .....Neutron capture therapy                        |
| .....Influenza                        | .....Noninvasive treatment                          |
| .....Injuries                         | .....Oncology                                       |
| .....Pregnancy                        | .....Orthopedic procedures                          |
| .....Retinopathy                      | .....Orthotics                                      |
| .....Sleep apnea                      | .....Pathology                                      |
| .....Thrombosis                       | .....Patient rehabilitation                         |
| .....Tumors                           | .....Pediatrics                                     |
| .....Medical diagnosis                | .....Pharmaceuticals                                |
| .....Autopsy                          | .....Surgery  |
| .....Bronchoscopy                     | .....Occupational medicine                          |
| .....Colonography                     | .....Prosthetics                                    |
| .....Computer aided diagnosis         | .....Artificial biological organs                   |
| .....Medical signal detection         | .....Artificial limbs                               |
| .....Nanomedicine                     | .....Prosthetic hand                                |
| .....Plethysmography                  | .....Prosthetic limbs                               |
| .....Sensitivity and specificity      | .....Visual prosthesis                              |
| .....Medical tests                    | .....Public healthcare                              |
| .....Amniocentesis                    | .....Sensory aids                                   |
| .....Biopsy                           | .....Hearing aids                                   |
| .....Cancer detection                 | .....Vaccines                                       |
| .....Colonoscopy                      | .....X-rays   |
| .....Pregnancy test                   | .....X-ray applications                             |
| .....Medical treatment                | .....X-ray detection                                |
| .....Anesthesia                       | .....X-ray scattering                               |
| .....Angioplasty                      | .....X-ray tomography                               |
| .....Brachytherapy                    | ....Nuclear medicine                                |
| .....Brain stimulation                | ....Synthetic biology                               |
| .....Cardiology                       |   |
| .....Chemotherapy                     |   |
| .....Clinical trials                  |   |
| .....Defibrillation                   | <b>Engineering management</b>                       |
| .....Dentistry                        | ....Business  |
| .....Electrical stimulation           | .....Industrial relations                           |
| .....Electronic medical prescriptions | .....Management                                     |
| .....Embolization                     | .....Asset management                               |
| .....Fibrillation                     | .....Best practices                                 |
| .....Gastroenterology                 | .....Business continuity                            |
| .....Gerontology                      | .....Business process re-engineering                |
| .....Gynecology                       | .....Communication system operations and management |
| .....Hepatectomy                      |   |

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| .....Content management                  | .....Macroeconomics                           |
| .....Contingency management              | .....Privatization                            |
| .....Contracts                           | .....Microeconomics                           |
| .....Customer relationship management    | .....Economies of scale                       |
| .....Decision making                     | .....Industrial economics                     |
| .....Enterprise resource planning        | .....Monopoly                                 |
| .....Financial management                | .....Oligopoly                                |
| .....Governmental factors                | .....Power generation economics               |
| .....Human resource management           | .....Electricity supply industry deregulation |
| .....Information management              | .....Profitability                            |
| .....International collaboration         | .....Stock markets                            |
| .....Knowledge management                | .....Supply and demand                        |
| .....Marketing management                | .....Trade agreements                         |
| .....Organizational aspects              | .....Venture capital                          |
| .....Outsourcing                         | .....Virtual enterprises                      |
| .....Process planning                    | ...Innovation management                      |
| .....Production management               | ...Legal factors                              |
| .....Project management                  | .....Copyright protection                     |
| .....Public relations                    | .....Software protection                      |
| .....Quality management                  | .....Law                                      |
| .....Research and development management | .....Commercial law                           |
| .....Resource management                 | .....Consumer protection                      |
| .....Risk analysis                       | .....Contract law                             |
| .....Supply chain management             | .....Criminal law                             |
| .....Operations research                 | .....Employment law                           |
| .....Inventory control                   | .....Forensics                                |
| .....Virtual enterprises                 | .....Law enforcement                          |
| .....Organizations                       | .....Patent law                               |
| .....BNSC                                | .....Trademarks                               |
| .....Companies                           | .....Law enforcement                          |
| .....Government                          | .....Patents                                  |
| .....Sociotechnical systems              | .....Product liability                        |
| ...Commercialization                     | .....Warranties                               |
| ...Economics                             | .....Software protection                      |
| .....Costs                               | .....Trademarks                               |
| .....Cost benefit analysis               | ...Market research                            |
| .....Econometrics                        | ...Product development                        |
| .....Economic forecasting                | .....Graphical user interfaces                |
| .....Economic indicators                 | .....Avatars                                  |
| .....Share prices                        | .....Product customization                    |
| .....Electronic commerce                 | .....Product life cycle management            |
| .....Environmental economics             | .....Prognostics and health management        |
| .....Carbon tax                          | .....Time to market                           |
| .....Exchange rates                      | ...Project engineering                        |
| .....Fuel economy                        | .....Scheduling                               |
| .....International trade                 | .....Adaptive scheduling                      |
|  | .....Dynamic scheduling                       |



- .....Job shop scheduling
- .....Single machine scheduling
- ....Research and development management
- .....Innovation management
- ....Research initiatives
- ....Software development management
- ....Technology management

### **Geoscience and remote sensing**

- ....Environmental factors
  - .....Biosphere
  - .....Ecosystems
  - .....Environmental economics
    - .....Carbon tax
  - .....Environmental monitoring
  - .....Global warming
  - .....Green products
    - .....Green buildings
    - .....Green cleaning
  - .....Pollution
    - .....Air pollution
      - .....Industrial pollution
      - .....Land pollution
      - .....Oil pollution
      - .....Radioactive pollution
      - .....Thermal pollution
      - .....Urban pollution
      - .....Water pollution
- ....Geographic information systems
  - .....Geospatial analysis
  - .....Gunshot detection systems
- ....Geophysical measurements
  - .....Geodesy
    - .....Level measurement
  - .....Sea measurements
    - .....Geoacoustic inversion
  - .....Seismic measurements
- ....Geophysical measurement techniques
- ....Geophysical signal processing
- ....Geoscience
  - .....Antarctica
    - .....South Pole
  - .....Arctic
    - .....North Pole
  - .....Atmosphere

- .....Atmospheric modeling
- .....Atmospheric waves
- .....Biosphere
- .....Continents
  - .....Africa
  - .....Asia
  - .....Australia
  - .....Europe
  - .....North America
  - .....South America
- .....Cyclones
  - .....Hurricanes
  - .....Tropical cyclones
  - .....Typhoons
- .....Earth
  - .....Earthquakes
    - .....Earthquake engineering
  - .....Forestry
  - .....Geography
    - .....Cities and towns
    - .....Rural areas
    - .....Urban areas
  - .....Geology
    - .....Minerals
    - .....Rocks
  - .....Geophysics
    - .....EMTDC
    - .....Extraterrestrial phenomena
    - .....Geodynamics
    - .....Geophysics computing
    - .....Meteorology
    - .....Moisture
    - .....Seismology
    - .....Surface waves
    - .....Well logging
  - .....Ice
    - .....Ice shelf
    - .....Ice surface
    - .....Ice thickness
    - .....Sea ice
  - .....Lakes
  - .....Land surface
  - .....Levee
  - .....Meteorological factors
  - .....Oceans
    - .....Ocean salinity
    - .....Ocean temperature

- .....Sea coast
  - .....Sea floor
  - .....Sea level
  - .....Sea surface
  - .....Tides
  - .....Rivers
  - .....Sediments
  - .....Soil
  - .....Soil moisture
  - .....Soil properties
  - .....Soil texture
  - .....Tornadoes
  - .....Tsunami
  - .....Volcanoes
  - .....Planetary volcanoes
  - .....Volcanic activity
  - .....Volcanic ash
  - ....Land surface temperature
  - ....Photometry
  - ....Radar
  - .....Airborne radar
  - .....Bistatic radar
  - .....Doppler radar
  - .....Ground penetrating radar
  - .....Laser radar
  - .....Meteorological radar
  - .....Millimeter wave radar
  - .....Multistatic radar
  - .....MIMO radar
  - .....Passive radar
  - .....Radar applications
  - .....Radar countermeasures
  - .....Radar detection
  - .....Radar imaging
  - .....Radar measurements
  - .....Radar polarimetry
  - .....Radar remote sensing
  - .....Radar tracking
  - .....Radar clutter
  - .....Radar cross-sections
  - .....Radar equipment
  - .....Radar theory
  - .....Spaceborne radar
  - .....Spread spectrum radar
  - .....Synthetic aperture radar
  - .....Inverse synthetic aperture radar
  - .....Polarimetric synthetic aperture radar
  - .....Ultra wideband radar
  - ....Radiometry
  - .....Microwave radiometry
  - .....Radiometers
  - .....Spectroradiometers
  - ....Remote sensing
  - .....Hyperspectral sensors
  - .....Hyperspectral imaging
  - .....Passive microwave remote sensing
  - .....Remote monitoring
  - ....Terrain mapping
  - .....Digital elevation models
  - ....Terrestrial atmosphere
  - .....Clouds
  - .....Global warming
  - .....Ionosphere
  - .....Magnetosphere
  - ....Vegetation mapping
- IEEE organizational topics**
- ....IEEE activities
  - .....Awards activities
  - .....Corporate recognition awards
  - .....External awards
  - .....Honorary membership
  - .....Medals
  - .....Prize paper awards
  - .....Scholarships
  - .....Service awards
  - .....Student awards
  - .....Technical field awards
  - .....Conferences
  - .....Corporate activities
  - .....Calendars
  - .....Ethics
  - .....Finance
  - .....Legislation
  - .....Meetings
  - .....Member relations
  - .....Membership development
  - .....Motion-planning
  - .....Planning
  - .....Public relations
  - .....Strategic planning
  - .....Technology planning

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|---------------------------------------|--|
| .....Educational activities           | .....PACE network  |
| .....Accreditation                    | .....Public policy                                       |
| .....Career development               | .....Volunteer activities                                |
| .....Continuing education             | .....Audit Committee                                     |
| .....Curriculum development           | .....Board of Directors Awards Board<br>Committee        |
| .....Educational programs             | .....Credentials Committee                               |
| .....Scholarships                     | .....Ethics Committee                                    |
| .....Intersociety activities          | .....Executive Committee                                 |
| .....Local activities                 | .....Fellow Committee                                    |
| .....Member and Geographic Activities | .....Life Members Committee                              |
| .....Conferences                      | .....Member Conduct Committee                            |
| .....Meetings                         | .....Nominations and elections                           |
| .....Nominations and elections        | .....Strategic Planning Committee                        |
| .....Organizing                       | .....Tellers Committee                                   |
| .....Professional activities          | .....Women in Engineering Committee                      |
| .....Career development               | ...IEEE entities   |
| .....Certification                    | .....Boards  |
| .....Consortia                        | .....Board of Directors                                  |
| .....Continuing education             | .....Educational Activities Board                        |
| .....Employment                       | .....IEEE Press Editorial Board                          |
| .....Ethics                           | .....IEEE Spectrum Editorial Board                       |
| .....Intellectual property            | .....Member and Geographic Activities<br>Board           |
| .....Legislation                      | .....Proceedings Editorial Board                         |
| .....Meetings                         | .....Publications Board                                  |
| .....Professional aspects             | .....Standards Board                                     |
| .....Public policy                    | .....Technical Activities Board                          |
| .....Publishing activities            | .....The Institute Editorial Board                       |
| .....Books                            | .....United States Activities Board                      |
| .....CD-ROMs                          | .....Center for the History of Electrical<br>Engineering |
| .....Conference proceedings           | .....History   |
| .....Indexes                          | .....Chapters  |
| .....Standards publication            | .....Student Chapters                                    |
| .....Standards activities             | .....Committees  |
| .....Standards development            | .....Awards committees                                   |
| .....Standards publication            | .....Board committees                                    |
| .....Student activities               | .....Communities   |
| .....Technical activities             | .....New Technology Connections Portal                   |
| .....Conferences                      | .....Online Communities/Technical<br>Collaboration       |
| .....Meetings                         | .....Standards Working Groups                            |
| .....Technical Activities Guide - TAG | .....Councils  |
| .....United States activities         | .....Accreditation Policy Council                        |
| .....Career development               | .....Career Policy Council                               |
| .....Continuing education             | .....Geographic Councils                                 |
| .....Employment                       |  |
| .....Ethics                           |  |
| .....Intellectual property            |  |
| .....Legislation                      |  |

.....IEEE Biometrics Council  
 .....IEEE Council on Electronic Design  
 Automation  
 .....IEEE Council on Superconductivity  
 .....IEEE Nanotechnology Council  
 .....IEEE Sensors Council  
 .....IEEE Systems Council  
 .....IEEE Technology Management Council  
 .....Lifelong Learning Council  
 .....Member Activities Council  
 .....Metropolitan Councils  
 .....Nanotechnology Council  
 .....Operations Council  
 .....Outreach Council  
 .....Professional Activities Council  
 .....Systems Council  
 .....Technical Councils  
 .....Technical Field Awards Council  
 .....Technology Policy Council  
 .....IEEE Computer Society Press  
 .....IEEE Foundation  
 .....IEEE Press  
 .....Regions  
 .....Chapters  
 .....Region 1  
 .....Region 10  
 .....Region 2  
 .....Region 3  
 .....Region 4  
 .....Region 5  
 .....Region 6  
 .....Region 7  
 .....Region 8  
 .....Region 9  
 .....Sections  
 .....Student Chapters  
 .....Sections  
 .....Chapters  
 .....Student Chapters  
 .....Societies  
 .....IEEE Aerospace and Electronic Systems  
 Society  
 .....IEEE Antennas and Propagation Society  
 .....IEEE Broadcast Technology Society  
 .....IEEE Circuits and Systems Society  
 .....IEEE Communications Society  
 .....IEEE Components, Packaging, and  
 Manufacturing Technology Society  
 .....IEEE Computational Intelligence Society  
 .....IEEE Computer Society  
 .....IEEE Consumer Electronics Society  
 .....IEEE Control Systems Society  
 .....IEEE Dielectrics and Electrical Insulation  
 Society  
 .....IEEE Education Society  
 .....IEEE Electromagnetic Compatibility  
 Society  
 .....IEEE Electron Devices Society  
 .....IEEE Engineering in Medicine and  
 Biology Society  
 .....IEEE Engineering Management Society  
 .....IEEE Geoscience and Remote Sensing  
 Society  
 .....IEEE Industrial Electronics Society  
 .....IEEE Industry Applications Society  
 .....IEEE Information Theory Society  
 .....IEEE Instrumentation and Measurement  
 Society  
 .....IEEE Intelligent Transportation Systems  
 Society  
 .....IEEE Lasers and Electro-Optics Society  
 .....IEEE Magnetics Society  
 .....IEEE Microwave Theory and Techniques  
 Society  
 .....IEEE Nuclear and Plasma Sciences  
 Society  
 .....IEEE Oceanic Engineering Society  
 .....IEEE Photonics Society  
 .....IEEE Power Electronics Society  
 .....IEEE Power & Energy Society  
 .....IEEE Reliability Society  
 .....IEEE Robotics and Automation Society  
 .....IEEE Signal Processing Society  
 .....IEEE Social Implications of Technology  
 Society  
 .....IEEE Solid-State Circuits Society  
 .....IEEE Systems, Man, and Cybernetics  
 Society  
 .....IEEE Technology Management Council  
 .....IEEE Ultrasonics, Ferroelectrics, and  
 Frequency Control Society  
 .....IEEE Vehicular Technology Society  
 .....Student Chapters

- ....IEEE governance
  - .....Bylaws
  - .....Constitution
  - .....IEEE Policy and Procedures
  - .....IEEE Staff
  - .....Mission and Vision
  - .....Organization Charts
- ....IEEE members
  - .....Associate members
  - .....Fellows
  - .....Joining IEEE
    - .....Signup web site
  - .....Life members
  - .....Senior members
  - .....Student members
- ....IEEE news
  - .....Chapter news
  - .....Region news
  - .....Section news
  - .....Society news
- ....IEEE products
  - .....Audio tapes
  - .....Catalogs
    - .....Educational Activities Product Catalog
    - .....IEEE catalog
    - .....IEEE Electronic catalog
    - .....IEEE standards catalog
    - .....New products catalog
  - .....Conference proceedings
  - .....Educational products
    - .....Reading series
    - .....Self-study courses
    - .....Videos
  - .....IEEE standards
    - .....IEEE 1394 Standard
    - .....IEEE 802.11 Standards
    - .....IEEE 802.15 Standards
    - .....IEEE 802.16 Standards
    - .....IEEE 802.3 Standards
  - .....IEEE Xplore
  - .....IEL
  - .....Merchandise
  - .....Reading series
  - .....Self-study courses
  - .....Videos
- ....IEEE publications
  - .....IEEE conference proceedings
  - .....IEEE directories
    - .....IEEE Membership Directory
    - .....IEEE Staff Directory
  - .....IEEE indexing
    - .....Awards
    - .....Book reviews
    - .....CD-ROM reviews
    - .....Editorials
    - .....Interviews
    - .....Obituaries
    - .....Software reviews
    - .....Special issues and sections
    - .....Tutorials
    - .....Video reviews
  - .....IEEE journals
    - .....IEEE Canadian Journal of Electrical and Computer Engineering
    - .....IEEE Communications Letters
    - .....IEEE Communications Surveys & Tutorials
    - .....IEEE Computer Architecture Letters
    - .....IEEE Electrochemical and Solid-State Letters
    - .....IEEE Electron Device Letters
    - .....IEEE Embedded Systems Letters
    - .....IEEE Journal of Microelectromechanical Systems
    - .....IEEE Journal of Oceanic Engineering
    - .....IEEE Journal of Quantum Electronics
    - .....IEEE Journal of Robotics and Automation
    - .....IEEE Journal of Selected Topics in Applied Earth Observation and Remote Sensing
    - .....IEEE Journal of Selected Topics in Quantum Electronics
    - .....IEEE Journal of Selected Topics in Signal Processing
    - .....IEEE Journal of Solid-State Circuits
    - .....IEEE Journal of Technology Computer Aided Design
    - .....IEEE Journal on Selected Areas in Communications
    - .....IEEE Latin America Learning Technologies Journal [IEEE-RITA]
    - .....IEEE Learning Technology
    - .....IEEE Magnetics Letters

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|--|---|
| .....IEEE Microwave and Guided Wave Letters                    | .....IEEE Multimedia  |
| .....IEEE/OSA Journal of Display Technology                    | .....IEEE Nanotechnology Magazine   |
| .....IEEE/OSA Journal of Lightwave Technology                  | .....IEEE Network   |
| .....IEEE/OSA Journal of Optical Communications and Networking | .....IEEE Personal Communications   |
| .....IEEE Photonics Journal                                    | .....IEEE Potentials  |
| .....IEEE Photonics Technology Letters                         | .....IEEE Power Engineering Review  |
| .....IEEE Reviews in Biomedical Engineering                    | .....IEEE Robotics and Automation Magazine                                  |
| .....IEEE Signal Processing Letters                            | .....IEEE Signal Processing Magazine  |
| .....IEEE Systems Journal                                      | .....IEEE Software  |
| .....Proceedings of the IEEE                                   | .....IEEE Solid-State Circuits Magazine                                     |
| .....IEEE magazines  | .....IEEE Spectrum  |
| .....IEEE Aerospace and Electronics Society Magazine           | .....IEEE Technology and Society Magazine                                   |
| .....IEEE Annals of the History of Computing                   | .....IEEE-USA Today's Engineer  |
| .....IEEE Antennas and Propagation Magazine                    | .....IEEE newsletters   |
| .....IEEE Circuits and Devices                                 | .....Broadcast Technology Society Newsletter                                |
| .....IEEE Communications Magazine                              | .....Center for the History of Electrical Engineering Newsletter            |
| .....IEEE Computational Intelligence                           | .....Circuits and Systems Society Newsletter                                |
| .....IEEE Computational Science and Engineering                | .....Components, Packaging, and Manufacturing Technology Society Newsletter |
| .....IEEE Computer Applications in Power                       | .....Consumer Electronics Society Newsletter                                |
| .....IEEE Computer Graphics and Applications                   | .....Education Society Newsletter   |
| .....IEEE Computer Magazine                                    | .....Electromagnetic Compatibility Society Newsletter                       |
| .....IEEE Concurrency  | .....Electron Devices Society Newsletter                                    |
| .....IEEE Control Systems                                      | .....Electronics and the Environment Newsletter                             |
| .....IEEE Design and Test of Computers                         | .....Engineering Management Society Newsletter                              |
| .....IEEE Electrical Insulation Magazine                       | .....Geoscience and Remote Sensing Society Newsletter                       |
| .....IEEE Engineering in Medicine and Biology Magazine         | .....IEEE Circuitboard  |
| .....IEEE Engineering Management Review                        | .....IEEE Looking Forward   |
| .....IEEE Industrial Electronics Magazine                      | .....IEEE Publications Bulletin   |
| .....IEEE Industry Applications Magazine                       | .....Industrial Electronics Society Newsletter                              |
| .....IEEE Instrumentation and Measurement Magazine             | .....Information Theory Society Newsletter                                  |
| .....IEEE Intelligent Systems and their Applications           | .....Instrumentation and Measurement Society Newsletter                     |
| .....IEEE Intelligent Transportation Systems Magazine          | .....Lasers and Electro-Optics Society Newsletter                           |
| .....IEEE Internet Computing                                   | .....Magnetics Society Newsletter   |
| .....IEEE Micro  | .....Microwave Theory and Techniques Society Newsletter                     |
| .....IEEE Multidisciplinary Engineering Education Magazine     |   |

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| .....Nuclear and Plasma Sciences Society Newsletter                        | .....IEEE Transactions on Network and Service Management                                |
| .....Oceanic Engineering Society Newsletter                                | .....IEEE Transactions on Services Computing  |
| .....Power Electronics Society Newsletter                                  | .....IEEE standard glossaries   |
| .....Professional Communication Society Newsletter                         | .....IEEE transactions  |
| .....Reliability Society Newsletter  | .....IEEE/ACM Transactions on Networking  |
| .....Systems, Man and Cybernetics Society Newsletter                       | .....IEEE Biometrics Compendium   |
| .....The Institute   | .....IEEE Latin America Transactions [Revista IEEE America Latina]                      |
| .....The Staff Circuit   | .....IEEE Transactions on Aerospace and Electronic Systems                              |
| .....Ultrasonics, Ferroelectrics, and Frequency Control Society Newsletter | .....IEEE Transactions on Affective Computing   |
| .....Vehicular Technology Society Newsletter                               | .....IEEE Transactions on Antennas and Propagation                                      |
| .....IEEE online publications  | .....IEEE Transactions on Applied Superconductivity                                     |
| .....IEEE Bibliographies On-line   | .....IEEE Transactions on Audio, Speech, and Language Processing                        |
| .....IEEE Canadian Journal of Electrical and Computer Engineering          | .....IEEE Transactions on Automatic Control   |
| .....IEEE Circuitboard   | .....IEEE Transactions on Automation Science and Engineering                            |
| .....IEEE Communications Interactive                                       | .....IEEE Transactions on Autonomous Mental Development                                 |
| .....IEEE Communications Surveys & Tutorials                               | .....IEEE Transactions on Biomedical Circuits and Systems                               |
| .....IEEE Distributed Systems Online                                       | .....IEEE Transactions on Biomedical Engineering  |
| .....IEEE Electrochemical and Solid-State Letters                          | .....IEEE Transactions on Broadcasting  |
| .....IEEE Electronic catalog   | .....IEEE Transactions on Circuits and Systems for Video Technology                     |
| .....IEEE Journal of Technology Computer Aided Design                      | .....IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications   |
| .....IEEE Journals and Transactions On-LINE - OpeRA                        | .....IEEE Transactions on Circuits and Systems II: Analog and Digital Signal Processing |
| .....IEEE Latin America Learning Technologies Journal [IEEE-RITA]          | .....IEEE Transactions on Communications  |
| .....IEEE Latin America Transactions [Revista IEEE America Latina]         | .....IEEE Transactions on Components, Packaging, and Manufacturing Technology Part A    |
| .....IEEE Learning Technology  | .....IEEE Transactions on Components, Packaging, and Manufacturing Technology Part B    |
| .....IEEE Looking Forward  | .....IEEE Transactions on Components, Packaging, and Manufacturing Technology Part C    |
| .....IEEE Multidisciplinary Engineering Education Magazine                 |   |
| .....IEEE Network Interactive  |   |
| .....IEEE Personal Communications Interactive                              |   |
| .....IEEE Photonics Journal  |   |
| .....IEEE Transactions on Computational Intelligence and AI in Games       |   |
| .....IEEE Transactions on Learning Technologies                            |   |

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| .....IEEE Transactions on Computational Intelligence and AI in Games               | .....IEEE Transactions on Network and Service Management                                 |
| .....IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems | .....IEEE Transactions on Neural Networks  |
| .....IEEE Transactions on Computers  | .....IEEE Transactions on Nuclear Science  |
| .....IEEE Transactions on Consumer Electronics                                     | .....IEEE Transactions on Pattern Analysis and Machine Intelligence                      |
| .....IEEE Transactions on Control Systems Technology                               | .....IEEE Transactions on Plasma Science   |
| .....IEEE Transactions on Dielectrics and Electrical Insulation                    | .....IEEE Transactions on Power Delivery   |
| .....IEEE Transactions on Education  | .....IEEE Transactions on Power Electronics  |
| .....IEEE Transactions on Electromagnetic Compatibility                            | .....IEEE Transactions on Power Systems  |
| .....IEEE Transactions on Electron Devices   | .....IEEE Transactions on Professional Communication                                     |
| .....IEEE Transactions on Energy Conversion  | .....IEEE Transactions on Rehabilitation Engineering                                     |
| .....IEEE Transactions on Engineering Management                                   | .....IEEE Transactions on Reliability  |
| .....IEEE Transactions on Evolutionary Computation                                 | .....IEEE Transactions on Robotics   |
| .....IEEE Transactions on Fuzzy Systems  | .....IEEE Transactions on Robotics and Automation  |
| .....IEEE Transactions on Geoscience and Remote Sensing                            | .....IEEE Transactions on Semiconductor Manufacturing                                    |
| .....IEEE Transactions on Haptics  | .....IEEE Transactions on Services Computing   |
| .....IEEE Transactions on Image Processing   | .....IEEE Transactions on Signal Processing  |
| .....IEEE Transactions on Industrial Electronics                                   | .....IEEE Transactions on Smart Grid   |
| .....IEEE Transactions on Industry Applications                                    | .....IEEE Transactions on Software Engineering   |
| .....IEEE Transactions on Information Forensics and Security                       | .....IEEE Transactions on Speech and Audio Processing                                    |
| .....IEEE Transactions on Information Technology in Biomedicine                    | .....IEEE Transactions on Sustainable Energy   |
| .....IEEE Transactions on Information Theory                                       | .....IEEE Transactions on Systems, Man, and Cybernetics Part A: Systems and Humans       |
| .....IEEE Transactions on Instrumentation and Measurement                          | .....IEEE Transactions on Systems, Man, and Cybernetics Part B: Cybernetics              |
| .....IEEE Transactions on Knowledge and Data Engineering                           | .....IEEE Transactions on Systems, Man, and Cybernetics Part C: Applications and Reviews |
| .....IEEE Transactions on Learning Technologies                                    | .....IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control              |
| .....IEEE Transactions on Magnetics  | .....IEEE Transactions on Vehicular Technology   |
| .....IEEE Transactions on Mechatronics   | .....IEEE Transactions on Very Large Scale Integration - VLSI                            |
| .....IEEE Transactions on Medical Imaging  | .....IEEE Transactions on Visualization and Computer Graphics                            |
| .....IEEE Transactions on Microwave Theory and Techniques                          | .....IEEE Women in Engineering   |
| .....IEEE Transactions on Nanotechnology   | .....Notice of Violation   |
|  | ....IEEE services  |
|  | .....Ask IEEE  |



- .....Conference management
- .....Meeting services
- .....Member services
- .....Career development
- .....Electronic mail
- .....Financial advantage program
- .....IEEE Bibliographies On-line
- .....IEEE Electronic catalog
- .....Job listing service
- .....Membership renewal
- .....Travel services
- .....Web and internet services
- .....Subscriptions
- .....Web and internet services
- .....Electronic mail
- .....IEEE Electronic catalog
- .....IEEE Journals and Transactions On-LINE
- OpeRA
- .....Online banking
- ....IEEE web sites
- .....Society home pages
- .....Web page design

### **Imaging**

- ....Biomedical imaging
- .....Angiocardiology
- .....Angiography
- .....Biomedical optical imaging
- .....Cardiology
- .....Echocardiography
- .....Electrocardiology
- .....Phonocardiography
- .....DICOM
- .....Encephalography
- .....Mammography
- .....Medical diagnostic imaging
- .....Anatomical structure
- .....Molecular imaging
- .....Phantoms
- ....Cameras
- .....Digital cameras
- .....Webcams
- ....Focusing
- ....Ground penetrating radar
- ....Holography

- ....Image converters
- .....Image intensifiers
- ....Image sensors
- .....Active pixel sensors
- .....CCD image sensors
- .....Charge-coupled image sensors
- .....CMOS image sensors
- .....Infrared image sensors
- ....Image storage
- ....Infrared imaging
- .....Night vision
- ....Magnetic resonance imaging
- .....Diffusion tensor imaging
- ....Magneto electrical resistivity imaging technique
- ....Microscopy
- .....Atomic force microscopy
- .....Electron microscopy
- .....Photoelectron microscopy
- .....Scanning electron microscopy
- .....Transmission electron microscopy
- .....Scanning probe microscopy
- ....Microwave imaging
- ....Motion pictures
- ....Multispectral imaging
- ....Nuclear imaging
- .....Energy resolution
- ....Optical imaging
- .....Talbot effect
- .....Thermoreflectance imaging
- ....Photography
- .....Cinematography
- .....Digital photography
- .....Photomicrography
- ....Radiation imaging
- ....Radiography
- .....Diagnostic radiography
- ....Stereo vision
- .....Stereo image processing
- ....Tomography
- .....Computed tomography
- .....Electrical capacitance tomography
- .....Positron emission tomography
- .....Whole-body PET
- .....Reconstruction algorithms
- .....Single photon emission computed tomography

**Industrial electronics**

- ....Assembly systems
  - .....Flexible electronics
  - .....Robotic assembly
- ....Computer aided manufacturing
  - .....CAD/CAM
  - .....Silicon compiler
- ....Cryogenic electronics
- ....Industrial control
  - .....Process control
    - .....Predictive control
    - .....Three-term control
    - .....Two-term control
  - .....Production control
    - .....Continuous production
    - .....Lot sizing
    - .....Optimized production technology
    - .....Scheduling
- ....Integrated manufacturing systems
- ....Machine control
  - .....Machine vector control
- ....Manufacturing automation
  - .....Computer aided manufacturing
    - .....CAD/CAM
    - .....Silicon compiler
  - .....Computer integrated manufacturing
  - .....Computer numerical control
  - .....Flexible manufacturing systems
- ....Testing
  - .....Aerospace testing
  - .....Automatic testing
    - .....Automatic test pattern generation
    - .....Ring generators
  - .....Benchmark testing
  - .....Built-in self-test
  - .....Circuit testing
    - .....Integrated circuit measurements
  - .....Electronic equipment testing
    - .....Immunity testing
  - .....Error analysis
    - .....Bit error rate
    - .....Finite wordlength effects
  - .....Error-free operations
  - .....Failure analysis
    - .....Equipment failure
      - .....Semiconductor device breakdown
  - .....Frequency response

- .....Impulse testing
- .....Insulator testing
  - .....Insulation testing
- .....Integrated circuit testing
  - .....Integrated circuit yield
- .....Logic testing
- .....Life testing
- .....Materials testing
  - .....Accelerated aging
  - .....Acoustic testing
  - .....Adhesive strength
  - .....Bonding forces
  - .....Delamination
  - .....Elastic recovery
  - .....Nondestructive testing
- .....Optical fiber testing
- .....Remaining life assessment
- .....Ring generators
- .....Semiconductor device testing
- .....Software testing
- .....System testing
  - .....Model checking
- .....Test equipment
  - .....Automatic test equipment
  - .....Test facilities
    - .....Anechoic chambers
    - .....Laboratories
    - .....Large Hadron Collider
    - .....Open area test sites
    - .....TEM cells

**Industry applications**

- ....Accident prevention
  - .....Accidents
    - .....Aerospace accidents
    - .....Electrical accidents
    - .....Industrial accidents
    - .....Marine accidents
    - .....Railway accidents
    - .....Road accidents
- ....Chemical technology
  - .....Chemical reactors
    - .....Bioreactors
  - .....Continuous-stirred tank reactor
- .....Ignition

- .....Chemical sensors
- .....Crystallizers
- .....Distillation equipment
- .....Fluidization
- .....Pharmaceutical technology
- .....Vitrification
- ....Cryogenics
- ....Electrochemical devices
- .....Amperometric sensors
- .....Batteries
- .....Battery management systems
- .....Fuel cells
- .....Supercapacitors
- ....Electrochemical processes
- ....Electromechanical systems
- .....Electromechanical devices
- .....Armature
- .....SAW filters
- ....Electrostatic devices
- ....Electrostatic precipitators
- ....Electrostatic processes
- .....Aerosols
- .....Electrophotography
- .....Electrostatic analysis
- .....Electrostatic induction
- .....Electrostatics
- .....Electrostatic levitation
- .....Particle charging
- .....Particle production
- .....Space charge
- .....Surface charging
- .....Triboelectricity
- .....Triboelectricity
- ....Engines
- .....Heat engines
- .....Steam engines
- .....Stirling engines
- .....Internal combustion engines
- .....Diesel engines
- .....Ignition
- .....Jet engines
- ....Environmental management
- .....Biodegradation
- .....Biodegradable materials
- .....Land use planning
- .....Pest control
- .....Pollution control
- .....Recycling
- .....Renewable energy sources
- .....Biomass
- .....Sustainable development
- .....Waste management
- .....Waste disposal
- .....Waste handling
- .....Waste recovery
- .....Waste reduction
- .....Water conservation
- .....Desalination
- .....Water resources
- .....Desalination
- .....Reservoirs
- ....Food technology
- .....Food preservation
- ....High-temperature techniques
- .....Rapid thermal processing
- ....Industrial engineering
- ....Industries
- .....Agriculture
- .....Agricultural products
- .....Aquaculture
- .....Fertilizers
- .....Greenhouses
- .....Irrigation
- .....Architecture
- .....Banking
- .....Beverage industry
- .....Chemical industry
- .....Coal industry
- .....Communication industry
- .....Computer industry
- .....Construction
- .....Buildings
- .....Green buildings
- .....Modular construction
- .....Prefabricated construction
- .....Construction industry
- .....Prefabricated construction
- .....Defense industry
- .....Entertainment industry
- .....Gas industry
- .....Manufacturing industries
- .....Aerospace industry
- .....Cement industry
- .....Ceramics industry

|                                      |                                |
|--------------------------------------|--------------------------------|
| .....Clothing industry               | .....Alternators               |
| .....Electrical products industry    | .....Brushless machines        |
| .....Electronics industry            | .....Compressors               |
| .....Food industry                   | .....Conductors                |
| .....Footwear industry               | .....DC machines               |
| .....Fuel processing industries      | .....Electric fences           |
| .....Glass industry                  | .....Generators                |
| .....Machinery production industries | .....Permanent magnet machines |
| .....Metal product industries        | .....Rotating machines         |
| .....Plastics industry               | .....Rotors                    |
| .....Pulp and paper industry         | .....Stators                   |
| .....Rubber industry                 | .....Washing machines          |
| .....Shipbuilding industry           | .....Fans                      |
| .....Textile industry                | .....Furnaces                  |
| .....Toy manufacturing industry      | .....Blast furnaces            |
| .....Metals industry                 | .....Kilns                     |
| .....Mining industry                 | .....Gears                     |
| .....Coal mining                     | .....Hydraulic systems         |
| .....Natural gas industry            | .....Electrohydraulics         |
| .....Petroleum industry              | .....Hydraulic equipment       |
| .....Oil drilling                    | .....Hydraulic fluids          |
| .....Oil refineries                  | .....Machine components        |
| .....Well logging                    | .....Air cleaners              |
| .....Power industry                  | .....Belts                     |
| .....Electrical equipment industry   | .....Cams                      |
| .....Electricity supply industry     | .....Engine cylinders          |
| .....Nuclear facility regulation     | .....Exhaust systems           |
| .....Power system interconnection    | .....Impellers                 |
| .....Sugar industry                  | .....Intake systems            |
| .....Sugar refining                  | .....Manifolds                 |
| .....Textile technology              | .....Mechanical splines        |
| .....Spinning                        | .....Pistons                   |
| .....Weaving                         | .....Rotors                    |
| .....Toy industry                    | .....Shafts                    |
| .....Wood industry                   | .....Valves                    |
| ....Inspection                       | .....Motors                    |
| .....Automatic optical inspection    | .....AC motors                 |
| ....Machinery                        | .....Brushless motors          |
| .....Agricultural machinery          | .....Commutation               |
| .....Ball bearings                   | .....DC motors                 |
| .....Belts                           | .....Electric motors           |
| .....Drives                          | .....Hysteresis motors         |
| .....Hydraulic drives                | .....Induction motors          |
| .....Motor drives                    | .....Micromotors               |
| .....Variable speed drives           | .....Permanent magnet motors   |
| .....Electric machines               | .....Servomotors               |
| .....AC machines                     | .....Traction motors           |

|                                  |  |
|----------------------------------|--|
| .....Universal motors            | .....Manufacturing systems             |
| .....Printing machinery          | .....Agile manufacturing               |
| .....Pumps                       | .....Automobile manufacture            |
| .....Fuel pumps                  | .....Batch production systems          |
| .....Heat pumps                  | .....Blanking                          |
| .....Micropumps                  | .....Cellular manufacturing            |
| .....Textile machinery           | .....Flow production systems           |
| .....Spinning machines           | .....Food manufacturing                |
| ....Manufacturing                | .....Forging                           |
| .....Assembly                    | .....Glass manufacturing               |
| .....Fitting                     | .....Integrated manufacturing systems  |
| .....Microassembly               | .....Intelligent manufacturing systems |
| .....Preforms                    | .....Job production systems            |
| .....Soldering                   | .....Joining processes                 |
| .....Assembly systems            | .....Layered manufacturing             |
| .....Flexible electronics        | .....Lean production                   |
| .....Robotic assembly            | .....Manufacturing processes           |
| .....Embossing                   | .....Mass production                   |
| .....Fabrication                 | .....Melt processing                   |
| .....Bonding processes           | .....Pulp manufacturing                |
| .....Optical device fabrication  | .....Sheet metal processing            |
| .....Soldering                   | .....Thermoforming                     |
| .....Welding                     | .....Mass customization                |
| .....Lithography                 | .....Tolerance analysis                |
| .....Colloidal lithography       | ....Packaging                          |
| .....Interferometric lithography | .....Bagging                           |
| .....Nanolithography             | .....Bottling                          |
| .....Soft lithography            | .....Canning                           |
| .....Stereolithography           | .....Encapsulation                     |
| .....X-ray lithography           | .....Labeling                          |
| .....Manufactured products       | .....Multichip modules                 |
| .....Ceramic products            | .....Plastic packaging                 |
| .....Chemical products           | .....Wrapping                          |
| .....Consumer products           | ....Paper technology                   |
| .....Electrical products         | ....Production                         |
| .....Food products               | .....Ball milling                      |
| .....Fuels                       | .....Compression molding               |
| .....Glass products              | .....Embossing                         |
| .....Mechanical products         | .....Food products                     |
| .....Metal products              | .....Dairy products                    |
| .....Paper products              | .....Fats                              |
| .....Paper pulp                  | .....Sugar                             |
| .....Plastic products            | .....Group technology                  |
| .....Rubber products             | .....Injection molding                 |
| .....Sports equipment            | .....Materials processing              |
| .....Textile products            | .....Annealing                         |
| .....Windows                     | .....Bleaching                         |

|                                      |  |
|--------------------------------------|--|
| .....Casting                         | .....Production engineering            |
| .....Coatings                        | .....Production planning               |
| .....Curing                          | .....Production equipment              |
| .....Etching                         | .....Applicators                       |
| .....Heat treatment                  | .....Clamps                            |
| .....Joining processes               | .....Cutting tools                     |
| .....Lamination                      | .....Fixtures                          |
| .....Machining                       | .....Machine tools                     |
| .....Melt processing                 | .....Mining equipment                  |
| .....Plasma materials processing     | .....Molding equipment                 |
| .....Pressing                        | .....Packaging machines                |
| .....Punching                        | .....Paper making machines             |
| .....Refining                        | .....Polishing machines                |
| .....Shearing                        | .....Soldering equipment               |
| .....Smelting                        | .....Production facilities             |
| .....Softening                       | .....Foundries                         |
| .....Swaging                         | .....Greenhouses                       |
| .....Mechanical products             | .....Industrial plants                 |
| .....Automotive components           | .....Machine shops                     |
| .....Axles                           | .....Paper mills                       |
| .....Bellows                         | .....Production management             |
| .....Blades                          | .....Control charts                    |
| .....Couplings                       | .....Inventory management              |
| .....Fasteners                       | .....Lead time reduction               |
| .....Flanges                         | .....Logistics                         |
| .....Gears                           | .....Process planning                  |
| .....Hoses                           | .....Production planning               |
| .....Machine components              | .....Production materials              |
| .....Mechanical guides               | .....Abrasives                         |
| .....Needles                         | .....Aerospace materials               |
| .....Orifices                        | .....Automotive materials              |
| .....Pistons                         | .....Inhibitors                        |
| .....Seals                           | .....Ink                               |
| .....Springs                         | .....Joining materials                 |
| .....Steering systems                | .....Lubricants                        |
| .....Structural shapes               | .....Retardants                        |
| .....Suspensions                     | .....Production systems                |
| .....Tires                           | .....Assembly systems                  |
| .....Vents                           | .....Exhaust systems                   |
| .....Wheels                          | .....Intelligent manufacturing systems |
| .....Process planning                | .....Lean production                   |
| .....Cause effect analysis           | .....Manufacturing systems             |
| .....Production control              | .....Steering systems                  |
| .....Continuous production           | .....Productivity                      |
| .....Lot sizing                      | .....Shafts                            |
| .....Optimized production technology | .....Camshafts                         |
| .....Scheduling                      | .....Springs                           |

- .....Suspensions
- .....Shock absorbers
- .....Transfer molding
- ....Safety
- .....Aerospace safety
- .....Air safety
- .....Domestic safety
- .....Emergency services
- .....Explosion protection
- .....Hazards
- .....Biohazards
- .....Chemical hazards
- .....Explosions
- .....Fires
- .....Flammability
- .....Floods
- .....Hazardous areas
- .....Hazardous materials
- .....Toxicology
- .....Health and safety
- .....Occupational health
- .....Occupational safety
- .....Marine safety
- .....Product safety
- .....Protection
- .....Explosion protection
- .....Lightning protection
- .....Radiation safety
- .....Safety devices
- .....Eye protection
- .....Protective clothing
- .....Vehicle safety
- ....Security
- .....Access control
- .....Authorization
- .....Alarm systems
- .....Smoke detectors
- .....Computer security
- .....Authentication
- .....Computer crime
- .....Computer hacking
- .....Identity management systems
- .....Invasive software
- .....Permission
- .....Cryptography
- .....Ciphers
- .....Encryption

- .....Public key
- .....Random number generation
- .....Data security
- .....Cryptography
- .....Message authentication
- .....Digital signatures
- .....Information security
- .....Intrusion detection
- .....Power system security
- .....Reconnaissance
- .....Terrorism
- .....Bioterrorism
- .....National security
- .....Watermarking
- ....Wine industry
- .....Wineries

#### **Information theory**

- ....Audio coding
- ....Biological information theory
- ....Channel coding
- .....Block codes
- .....Linear code
- .....Combined source-channel coding
- .....Turbo codes
- ....Codes
- .....Binary codes
- .....Reflective binary codes
- .....Convolutional codes
- .....Cyclic redundancy check codes
- .....Error correction codes
- .....Reed-Solomon codes
- .....Parity check codes
- .....Iterative decoding
- .....Product codes
- .....Bar codes
- .....Space-time codes
- ....Communication channels
- .....Channel allocation
- .....Channel capacity
- .....Channel estimation
- .....Channel models
- .....Channel spacing
- .....Channel state information
- .....Gaussian channels

- .....AWGN channels
  - .....Multipath channels
  - .....Multiuser channels
  - .....Partial response channels
  - .....Throughput
  - .....Time-varying channels
  - ....Decoding
    - .....Maximum likelihood decoding
  - ....Encoding
    - .....Audio coding
    - .....Channel coding
      - .....Block codes
      - .....Combined source-channel coding
      - .....Turbo codes
      - .....Entropy coding
        - .....Huffman coding
      - .....Source coding
      - .....Speech coding
      - .....Transcoding
    - .....Error compensation
    - .....Genetic communication
    - .....Hamming distance
    - .....Hamming weight
    - .....Information entropy
    - .....Mutual information
    - .....Network coding
    - .....Rate-distortion
    - .....Rate distortion theory
      - .....Channel rate control
    - .....Source coding
    - .....Speech coding
- Instrumentation and measurement**
- ....Computerized instrumentation
  - ....Electric variables
    - .....Admittance
    - .....Capacitance
      - .....Parasitic capacitance
      - .....Quantum capacitance
    - .....Capacitance-voltage characteristics
    - .....Conductivity
      - .....Photoconductivity
      - .....Semiconductivity
      - .....Transconductance
    - .....Current
  - .....Bioimpedance
  - .....Current slump
  - .....Dark current
  - .....Fault currents
  - .....Leakage currents
  - .....Persistent currents
  - .....Short-circuit currents
  - .....Threshold current
  - .....Current-voltage characteristics
  - .....Electric potential
  - .....Gain
  - .....Impedance
  - .....Impedance matching
  - .....Inductance
  - .....Permittivity
  - .....Piezoresistance
  - .....Q-factor
  - .....Resistance
    - .....Electric resistance
    - .....Piezoresistance
    - .....Surface resistance
    - .....Thermal resistance
  - .....Viscosity
  - .....Voltage
    - .....Breakdown voltage
    - .....Dynamic voltage scaling
    - .....Threshold voltage
    - .....Voltage fluctuations
  - .....Wiring
  - ....High energy physics instrumentation computing
    - .....Linear particle accelerator
  - ....Instruments
    - .....Compass
    - .....Goniometers
    - .....Microscopy
      - .....Atomic force microscopy
      - .....Electron microscopy
      - .....Scanning probe microscopy
    - .....Oscilloscopes
    - .....Potentiometers
    - .....Pressure gauges
    - .....Probes
    - .....Radiometers
      - .....Spectroradiometers
    - .....Telescopes
    - .....Theodolites



|  |                                      |
|--|--------------------------------------|
| .....Tuners                            | .....Partial discharge measurement   |
| .....Vibrometers                       | .....Phasor measurement units        |
| .....Voltmeters                        | .....Power measurement               |
| .....Wathour meters                    | .....Q measurement                   |
| .....Wattmeters                        | .....Transmission line measurements  |
| ....Measurement                        | .....Voltage measurement             |
| .....Accelerometers                    | .....Electromagnetic measurements    |
| .....Acoustic measurements             | .....Electromagnetic modeling        |
| .....Antenna measurements              | .....Linearity                       |
| .....Anthropometry                     | .....Microwave measurement           |
| .....Area measurement                  | .....Millimeter wave measurements    |
| .....Atmospheric measurements          | .....Parameter extraction            |
| .....Atomic measurements               | .....Polarimetry                     |
| .....Biomedical measurement            | .....Radiometry                      |
| .....Biomarkers                        | .....Submillimeter wave measurements |
| .....Biomedical monitoring             | .....Extraterrestrial measurements   |
| .....Electroencephalography            | .....Fluid flow measurement          |
| .....Electromyography                  | .....Frequency measurement           |
| .....Electrooculography                | .....Frequency-domain analysis       |
| .....Electrophysiology                 | .....Frequency estimation            |
| .....Photoplethysmography              | .....Gain measurement                |
| .....Reproducibility of results        | .....Gas chromatography              |
| .....Sensitivity and specificity       | .....Geologic measurements           |
| .....Calorimetry                       | .....Geophysical measurements        |
| .....Coordinate measuring machines     | .....Geodesy                         |
| .....Density measurement               | .....Sea measurements                |
| .....Hydrometers                       | .....Seismic measurements            |
| .....Distance measurement              | .....Interferometry                  |
| .....Euclidean distance                | .....Fabry-Perot                     |
| .....Distortion measurement            | .....Interferometers                 |
| .....Total harmonic distortion         | .....Optical interferometry          |
| .....Doppler measurement               | .....Phase shifting interferometry   |
| .....Dosimetry                         | .....Radar interferometry            |
| .....Dynamic range                     | .....Radio interferometry            |
| .....Electric variables measurement    | .....Sagnac interferometers          |
| .....Admittance measurement            | .....Length measurement              |
| .....Ammeters                          | .....Lifetime estimation             |
| .....Attenuation measurement           | .....Loss measurement                |
| .....Capacitance measurement           | .....Packet loss                     |
| .....Conductivity measurement          | .....Magnetic variables measurement  |
| .....Current measurement               | .....Magnetic field measurement      |
| .....Dielectric measurement            | .....Magnetometers                   |
| .....Electrical resistance measurement | .....Permeability measurement        |
| .....Electrostatic measurements        | .....Measurement by laser beam       |
| .....Energy measurement                | .....Laser velocimetry               |
| .....Impedance measurement             | .....Measurement techniques          |
| .....Inductance measurement            | .....Calibration                     |

.....Dynamic equilibrium  
 .....Measurement uncertainty  
 .....Measurement units  
 .....Nanometers  
 .....Mechanical variables measurement  
 .....Angular velocity  
 .....Displacement measurement  
 .....Force measurement  
 .....Motion measurement  
 .....Position measurement  
 .....Rotation measurement  
 .....Strain measurement  
 .....Stress measurement  
 .....Thickness measurement  
 .....Torque measurement  
 .....Velocity measurement  
 .....Vibration measurement  
 .....Volume measurement  
 .....Weight measurement  
 .....Moisture measurement  
 .....Humidity measurement  
 .....Noise measurement  
 .....Multiple signal classification  
 .....Noise figure  
 .....Noise shaping  
 .....Nuclear measurements  
 .....Particle tracking  
 .....Optical variables measurement  
 .....Ellipsometry  
 .....Photometry  
 .....Reflection coefficient  
 .....Refractive index  
 .....Particle beam measurements  
 .....Particle measurements  
 .....Performance evaluation  
 .....Phase measurement  
 .....pH measurement  
 .....Plasma measurements  
 .....Plethysmography  
 .....Pollution measurement  
 .....Pressure measurement  
 .....Altimetry  
 .....Pulse measurements  
 .....Reflectometry  
 .....Reproducibility of results  
 .....Scintillation counters  
 .....Solid scintillation detectors  
 .....Sea state  
 .....Semiconductor device measurement  
 .....Sensitivity  
 .....Sensitivity analysis  
 .....Shape measurement  
 .....Size measurement  
 .....Software measurement  
 .....Software metrics  
 .....Soil measurements  
 .....Spectroscopy  
 .....Electrochemical impedance spectroscopy  
 .....Kirchhoff's Law  
 .....Mass spectroscopy  
 .....MERIS  
 .....Neutron spin echo  
 .....Photoacoustic effects  
 .....Resonance light scattering  
 .....Thermal variables measurement  
 .....Temperature measurement  
 .....Time measurement  
 .....Clocks  
 .....Time dissemination  
 .....Timing  
 .....UHF measurements  
 .....Ultrasonic variables measurement  
 .....Viscosity  
 .....Wavelength measurement  
 .....Wide area measurements  
 ....Monitoring  
 .....Computerized monitoring  
 .....Environmental monitoring  
 .....Patient monitoring  
 .....Radiation monitoring  
 .....Radiation dosage  
 .....Remote monitoring  
 .....Surveillance  
 .....Infrared surveillance  
 .....Video surveillance  
 ....Testing  
 .....Aerospace testing  
 .....Automatic testing  
 .....Automatic test pattern generation  
 .....Ring generators  
 .....Benchmark testing  
 .....Built-in self-test  
 .....Circuit testing

- .....Integrated circuit measurements
- .....Electronic equipment testing
- .....Immunity testing
- .....Error analysis
- .....Bit error rate
- .....Finite wordlength effects
- .....Error-free operations
- .....Failure analysis
- .....Equipment failure
- .....Semiconductor device breakdown
- .....Frequency response
- .....Impulse testing
- .....Insulator testing
- .....Insulation testing
- .....Integrated circuit testing
- .....Integrated circuit yield
- .....Logic testing
- .....Life testing
- .....Materials testing
- .....Accelerated aging
- .....Acoustic testing
- .....Adhesive strength
- .....Bonding forces
- .....Delamination
- .....Elastic recovery
- .....Nondestructive testing
- .....Optical fiber testing
- .....Remaining life assessment
- .....Ring generators
- .....Semiconductor device testing
- .....Software testing
- .....System testing
- .....Model checking
- .....Test equipment
- .....Automatic test equipment
- .....Test facilities
- .....Anechoic chambers
- .....Laboratories
- .....Large Hadron Collider
- .....Open area test sites
- .....TEM cells

#### **Intelligent transportation systems**

- ....Automated highways
- ....Geographic information systems

- .....Geospatial analysis
- .....Gunshot detection systems
- ....Intelligent vehicles
- ....Navigation
- .....Aircraft navigation
- .....Course correction
- .....Dead reckoning
- .....Inertial navigation
- .....Marine navigation
- .....Radio navigation
- .....Satellite navigation systems
- .....Global Positioning System
- .....Satellite constellations
- .....Sonar navigation
- ....Transportation
- .....Air transportation
- .....Aircraft
- .....Airports
- .....Land transportation
- .....Rail transportation
- .....Road transportation
- .....Vehicles
- .....Land vehicles
- .....Remotely operated vehicles
- .....Space vehicles

#### **Lasers and electrooptics**

- ....Electrooptic devices
- .....Electrochromic devices
- .....Electrooptic deflectors
- .....Electrooptic modulators
- ....Electrooptic effects
- .....Electrochromism
- .....Kerr effect
- .....Optical bistability
- .....Stark effect
- ....Lasers
- .....Atom lasers
- .....Chemical lasers
- .....Diode lasers
- .....Free electron lasers
- .....Gas lasers
- .....Laser applications
- .....Dark states
- .....Distributed feedback devices

- .....Laser ablation
- .....Laser beam cutting
- .....Laser fusion
- .....Laser theory
- .....Magneto-optic recording
- .....Laser excitation
- .....Optical pumping
- .....Laser modes
- .....Laser mode locking
- .....Laser stability
- .....Laser transitions
- .....Power lasers
- .....Pump lasers
- .....Quantum well lasers
- .....Quantum cascade lasers
- .....Ring lasers
- .....Fiber lasers
- .....Semiconductor lasers
- .....Laser tuning
- .....Quantum dot lasers
- .....Quantum well lasers
- .....Semiconductor laser arrays
- .....Semiconductor optical amplifiers
- .....Surface emitting lasers
- .....Solid lasers
- .....Microchip lasers
- .....Quantum well lasers
- .....Semiconductor lasers
- .....Surface emitting lasers
- .....Surface emitting lasers
- .....Vertical cavity surface emitting lasers
- .....X-ray lasers
- ....Optics
- .....Adaptive optics
- .....Birefringence
- .....Brightness
- .....Brightness temperature
- .....Color
- .....Pigmentation
- .....Electron optics
- .....Extinction coefficients
- .....Extinction ratio
- .....Fiber optics
- .....Fiber nonlinear optics
- .....Optical fibers
- .....Fluorescence
- .....Four-wave mixing
- .....Geometrical optics
- .....Ray tracing
- .....Integrated optics
- .....Light sources
- .....Electroluminescent devices
- .....Fast light
- .....Luminescent devices
- .....Phosphors
- .....Slow light
- .....Stray light
- .....Superluminescent diodes
- .....Ultraviolet sources
- .....Luminescence
- .....Bioluminescence
- .....Electroluminescence
- .....Fluorescence
- .....Phosphorescence
- .....Photoluminescence
- .....Thermoluminescence
- .....Microoptics
- .....Micromirrors
- .....Nonlinear optics
- .....Fiber nonlinear optics
- .....Nonlinear optical devices
- .....Optical mixing
- .....Optical saturation
- .....Photorefractive effect
- .....Raman scattering
- .....Supercontinuum generation
- .....Optical amplifiers
- .....Doped fiber amplifiers
- .....Erbium-doped fiber amplifiers
- .....Semiconductor optical amplifiers
- .....Optical crosstalk
- .....Optical design
- .....Optical design techniques
- .....Optical devices
- .....Bragg gratings
- .....Collimators
- .....Displays
- .....Holographic optical components
- .....Lenses
- .....Light deflectors
- .....Lighting
- .....Luminescent devices
- .....Mirrors
- .....Optical arrays

- .....Optical attenuators
  - .....Optical collimators
  - .....Optical device fabrication
  - .....Optical filters
  - .....Optical resonators
  - .....Optical sensors
  - .....Thermo-optical devices
  - .....Optical distortion
  - .....Optical fiber applications
  - .....Optical fiber devices
  - .....Optical harmonic generation
  - .....Optical losses
  - .....Optical microscopy
  - .....Optical mixing
  - .....Multiwave mixing
  - .....Optical polarization
  - .....Polarization shift keying
  - .....Stokes parameters
  - .....Optical pulses
  - .....Optical retarders
  - .....Optical saturation
  - .....Optical solitons
  - .....Optical tuning
  - .....Particle beam optics
  - .....Atom optics
  - .....Electron optics
  - .....Stimulated emission
  - .....Photoluminescence
  - .....Physical optics
  - .....Optical refraction
  - .....Optical vortices
  - .....Ray tracing
  - .....Stray light
  - .....Ultrafast optics
  - .....Whispering gallery modes
  - ....Optoelectronic devices
  - .....Charge-coupled image sensors
  - .....Integrated optoelectronics
  - .....Light emitting diodes
  - .....Inorganic light emitting diodes
  - .....LED lamps
  - .....Organic light emitting diodes
  - .....Superluminescent diodes
  - .....Photoconducting devices
  - .....Electrophotography
  - .....Photodetectors
  - .....Photodiodes
  - .....Phototransistors
  - .....Superconducting photodetectors
  - .....Superluminescent diodes
  - ....Photonics
  - .....Biophotonics
  - .....Microwave photonics
  - .....Nanophotonics
  - .....Photochromism
  - .....Photothermal effects
  - .....Spontaneous emission
  - .....Radiative recombination
- Magnetics**
- ....Biomagnetics
  - .....Magnetoencephalography
  - ....Demagnetization
  - ....Gyromagnetism
  - ....Magnetic analysis
  - .....Magnetization
  - ....Magnetic anisotropy
  - .....Magnetic domains
  - .....Magnetic domain walls
  - .....Magnetic moments
  - .....Perpendicular magnetic anisotropy
  - ....Magnetic devices
  - .....Accelerator magnets
  - .....Ferrite devices
  - .....Circulators
  - .....Magnetic cores
  - .....Transformer cores
  - .....Magnetic heads
  - .....Magnetic memory
  - .....Floppy disks
  - .....Hard disks
  - .....Magnetic modulators
  - .....Magneto-optic devices
  - .....Magneto-resistive devices
  - .....Magnetostrictive devices
  - .....Solenoids
  - .....Transformer cores
  - .....Undulators
  - ....Magnetic fields
  - .....Geomagnetism
  - .....Magnetic reconnection
  - .....Magnetic separation



|                                 |                                  |
|---------------------------------|----------------------------------|
| .....Oxygen                     | .....Ceramics                    |
| .....Roentgenium                | .....Porcelain                   |
| .....Tellurium                  | .....Composite materials         |
| .....Titanium                   | .....Conducting materials        |
| .....Titanium alloys            | .....Corrosion inhibitors        |
| .....Titanium compounds         | .....Crystalline materials       |
| .....Ytterbium                  | .....Nanocrystals                |
| .....Zirconium                  | .....Superlattices               |
| ....Compounds                   | .....Crystals                    |
| .....Bismuth compounds          | .....Colloidal crystals          |
| .....Gallium compounds          | .....Crystallography             |
| .....Aluminum gallium nitride   | .....Crystal microstructure      |
| .....Gallium arsenide           | .....Grain boundaries            |
| .....Gallium nitride            | .....Grain size                  |
| .....Indium gallium arsenide    | .....Liquid crystals             |
| .....Indium gallium nitride     | .....Dielectric materials        |
| .....Indium compounds           | .....Dielectric films            |
| .....Indium gallium arsenide    | .....Dielectric liquids          |
| .....Indium tin oxide           | .....Electrets                   |
| .....Inorganic compounds        | .....Epoxy resins                |
| .....Lead compounds             | .....High K dielectric materials |
| .....Organic compounds          | .....Piezoelectric materials     |
| .....Carbon compounds           | .....Films                       |
| .....Organic semiconductors     | .....Conductive films            |
| .....Volatile organic compounds | .....Dielectric films            |
| .....Silicon compounds          | .....Epitaxial layers            |
| .....Silicides                  | .....Ferrimagnetic films         |
| .....Silicon carbide            | .....Ferrite films               |
| ....Materials                   | .....Garnet films                |
| .....Acoustic materials         | .....Magnetic films              |
| .....Additives                  | .....Optical films               |
| .....Aggregates                 | .....Piezoelectric films         |
| .....Amorphous materials        | .....Plastic films               |
| .....Diamond-like carbon        | .....Polymer films               |
| .....Glass                      | .....Semiconductor films         |
| .....Auxetic materials          | .....Thick films                 |
| .....Biological materials       | .....Thin films                  |
| .....Biomedical materials       | .....Fluids                      |
| .....Bioceramics                | .....Fluid dynamics              |
| .....Biomembranes               | .....Gases                       |
| .....Building materials         | .....Hydraulic fluids            |
| .....Asphalt                    | .....Liquids                     |
| .....Concrete                   | .....Viscosity                   |
| .....Floors                     | .....Hazardous materials         |
| .....Mortar                     | .....Inorganic materials         |
| .....Tiles                      | .....Lacquers                    |
| .....Windows                    | .....Laminates                   |

|   |                                    |
|---|------------------------------------|
| .....Magnetic materials                 | .....Plastic films                 |
| .....Amorphous magnetic materials       | .....Plastic optical fiber         |
| .....Antiferromagnetic materials        | .....Polymer foams                 |
| .....Diamagnetic materials              | .....Polymer gels                  |
| .....Ferrimagnetic films                | .....Polymers                      |
| .....Ferrimagnetic materials            | .....Liquid crystal polymers       |
| .....Ferrite films                      | .....Optical polymers              |
| .....Ferrites                           | .....Polyethylene                  |
| .....Garnet films                       | .....Polyimides                    |
| .....Garnets                            | .....Production materials          |
| .....Magnetic films                     | .....Abrasives                     |
| .....Magnetic liquids                   | .....Aerospace materials           |
| .....Magnetic semiconductors            | .....Automotive materials          |
| .....Magnetic superlattices             | .....Inhibitors                    |
| .....Paramagnetic materials             | .....Ink                           |
| .....Soft magnetic materials            | .....Joining materials             |
| .....Material properties                | .....Lubricants                    |
| .....Creep                              | .....Retardants                    |
| .....Elasticity                         | .....Radioactive materials         |
| .....Resilience                         | .....Nuclear fuels                 |
| .....Media                              | .....Radioactive decay             |
| .....Nonhomogeneous media               | .....Radioactive waste             |
| .....Random media                       | .....Raw materials                 |
| .....Mesoporous materials               | .....Resins                        |
| .....Metal foam                         | .....Epoxy resins                  |
| .....Metamaterials                      | .....Resists                       |
| .....Nanostructured materials           | .....Semiconductor materials       |
| .....Nanocomposites                     | .....Amorphous semiconductors      |
| .....Nanoporous materials               | .....Elemental semiconductors      |
| .....Oils                               | .....Gallium                       |
| .....Lubricating oils                   | .....Gallium arsenide              |
| .....Vegetable oils                     | .....Germanium                     |
| .....Optical materials                  | .....III-V semiconductor materials |
| .....Optical polymers                   | .....II-VI semiconductor materials |
| .....Optical retarders                  | .....Indium gallium arsenide       |
| .....Optical superlattices              | .....Indium phosphide              |
| .....Photorefractive materials          | .....Magnetic semiconductors       |
| .....Organic inorganic hybrid materials | .....Organic semiconductors        |
| .....Organic materials                  | .....Semiconductor superlattices   |
| .....Paints                             | .....Silicon                       |
| .....Paper pulp                         | .....Silicon germanium             |
| .....Petrochemicals                     | .....Substrates                    |
| .....Phase change materials             | .....Wide band gap semiconductors  |
| .....Photoconducting materials          | .....Sheet materials               |
| .....Plastics                           | .....Solids                        |
| .....Epoxy resins                       | .....Young's modulus               |
| .....Fiber reinforced plastics          | .....Superconducting materials     |



|                                       |                             |
|---------------------------------------|-----------------------------|
| .....Granular superconductors         | .....Sputtering             |
| .....High-temperature superconductors | .....Materials reliability  |
| .....Multifilamentary superconductors | .....Materials testing      |
| .....Niobium-tin                      | .....Accelerated aging      |
| .....Type II superconductors          | .....Acoustic testing       |
| .....Textiles                         | .....Adhesive strength      |
| .....Cotton                           | .....Bonding forces         |
| .....Fabrics                          | .....Delamination           |
| .....Textile fibers                   | .....Elastic recovery       |
| .....Wool                             | .....Nondestructive testing |
| .....Waste materials                  | .....Microstructure         |
| .....Effluents                        | .....Periodic structures    |
| .....Electronic waste                 | .....Gratings               |
| .....Industrial waste                 | .....Photonic crystals      |
| .....Radioactive waste                | .....Pigmentation           |
| .....Slurries                         | .....Pigments               |
| .....Wastewater                       | .....Separation processes   |
| .....Wire                             | .....Fractionation          |
| ...Materials science and technology   | .....Particle separators    |
| .....Absorption                       | .....Surface engineering    |
| .....Aging                            | .....Surfaces               |
| .....Accelerated aging                | .....Corrosion              |
| .....Chemical analysis                | .....Corrugated surfaces    |
| .....Activation analysis              | .....Rough surfaces         |
| .....Chemical processes               | .....Surface impedance      |
| .....Chemicals                        | .....Surface morphology     |
| .....Electronic noses                 | .....Surface resistance     |
| .....pH measurement                   | .....Surface roughness      |
| .....Contamination                    | .....Surface soil           |
| .....Surface contamination            | .....Surface structures     |
| .....Degradation                      | .....Surface tension        |
| .....Filtration                       | .....Surface texture        |
| .....Microfiltration                  | .....Surface topography     |
| .....Hysteresis                       | .....Surface treatment      |
| .....Impurities                       | ...Material storage         |
| .....Semiconductor impurities         | .....Bulk storage           |
| .....Materials handling               | .....Containers             |
| .....Cleaning                         | .....Freight containers     |
| .....Decontamination                  | .....Fuel storage           |
| .....Freight handling                 | .....Secure storage         |
| .....Materials handling equipment     | .....Stacking               |
| .....Remote handling                  | .....Storage automation     |
| .....Materials preparation            | .....Warehousing            |
| .....Doping                           | .....Water storage          |
| .....Firing                           | .....Reservoirs             |
| .....Ion implantation                 | ...Metals                   |
| .....Laser sintering                  | .....Alloying               |

|                          |                                       |
|--------------------------|---------------------------------------|
| .....Intermetallic       | .....Integrated circuit metallization |
| .....Shape memory alloys | .....Neodymium                        |
| .....Aluminum            | .....Neodymium alloys                 |
| .....Aluminum alloys     | .....Neodymium compounds              |
| .....Aluminum compounds  | .....Nickel                           |
| .....Barium              | .....Nickel alloys                    |
| .....Barium compounds    | .....Niobium                          |
| .....Bismuth             | .....Niobium alloys                   |
| .....Boron               | .....Niobium compounds                |
| .....Boron alloys        | .....Palladium                        |
| .....Cadmium             | .....Platinum                         |
| .....Cadmium compounds   | .....Platinum alloys                  |
| .....Calcium             | .....Rare earth metals                |
| .....Calcium compounds   | .....Samarium                         |
| .....Chromium            | .....Samarium alloys                  |
| .....Chromium alloys     | .....Silver                           |
| .....Cobalt              | .....Steel                            |
| .....Cobalt alloys       | .....Strontium                        |
| .....Copper              | .....Strontium compounds              |
| .....Copper alloys       | .....Tin                              |
| .....Copper compounds    | .....Tin alloys                       |
| .....Digital alloys      | .....Tin compounds                    |
| .....Erbium              | .....Titanium                         |
| .....Gallium             | .....Titanium alloys                  |
| .....Gallium alloys      | .....Titanium compounds               |
| .....Germanium           | .....Tungsten                         |
| .....Germanium alloys    | .....Yttrium                          |
| .....Gold                | .....Yttrium compounds                |
| .....Gold alloys         | .....Zinc                             |
| .....Hafnium             | .....Zinc compounds                   |
| .....Hafnium compounds   |                                       |
| .....Indium              |                                       |
| .....Iron                |                                       |
| .....Cast iron           | <b>Mathematics</b>                    |
| .....Iron alloys         | ....Accuracy                          |
| .....Lanthanum           | ....Algebra                           |
| .....Lanthanum compounds | .....Abstract algebra                 |
| .....Lead                | .....Galois fields                    |
| .....Lead isotopes       | .....Modules (abstract algebra)       |
| .....Lithium             | .....Boolean algebra                  |
| .....Lithium compounds   | .....Boolean functions                |
| .....Magnesium           | .....Linear algebra                   |
| .....Magnesium compounds | .....Linear programming               |
| .....Manganese           | .....Matrices                         |
| .....Manganese alloys    | .....Vectors                          |
| .....Mercury (metals)    | .....Set theory                       |
| .....Metallization       | .....Fuzzy sets                       |

.....Fuzzy set theory  
 .....Rough sets  
 ....Algorithms  
 .....Adaptive algorithms  
 .....Adaptation models  
 .....Algorithm design and analysis  
 .....Approximation algorithms  
 .....Backpropagation algorithms  
 .....Basis algorithms  
 .....Change detection algorithms  
 .....Classification algorithms  
 .....Clustering algorithms  
 .....Compression algorithms  
 .....Density estimation robust algorithm  
 .....Detection algorithms  
 .....Distributed algorithms  
 .....Dynamic programming  
 .....Filtering algorithms  
 .....Genetic algorithms  
 .....Heuristic algorithms  
 .....Inference algorithms  
 .....Least mean square algorithms  
 .....Machine learning algorithms  
 .....Matching pursuit algorithms  
 .....Maximum likelihood detection  
 .....MLFMA  
 .....Multicast algorithms  
 .....Parallel algorithms  
 .....Partitioning algorithms  
 .....Prediction algorithms  
 .....Projection algorithms  
 .....Pursuit algorithms  
 .....Signal processing algorithms  
 .....Software algorithms  
 .....Viterbi algorithm  
 ....Arithmetic  
 .....Digital arithmetic  
 .....Fixed-point arithmetic  
 .....Floating-point arithmetic  
 ....Azimuth  
 .....Azimuthal angle  
 .....Azimuthal component  
 .....Azimuthal current  
 .....Azimuthal harmonics  
 .....Azimuthal plane  
 ....Boundary value problems  
 .....Boundary conditions  
 .....Upper bound  
 ....Calculus  
 .....Differential equations  
 .....Differential algebraic equations  
 .....Navier-Stokes equations  
 .....Partial differential equations  
 .....Transfer functions  
 .....Integral equations  
 .....Probability density function  
 .....Level set  
 ....Closed-form solutions  
 ....Combinatorial mathematics  
 .....Graph theory  
 .....Bipartite graph  
 .....Optimal matching  
 .....Reachability analysis  
 .....Shortest path problem  
 .....Tree graphs  
 .....Steiner trees  
 ....Computational efficiency  
 ....Conformal mapping  
 ....Convergence  
 ....Convex functions  
 ....Cyclic redundancy check  
 .....Cyclic redundancy check codes  
 ....Eigenvalues and eigenfunctions  
 ....Equations  
 .....Boltzmann equation  
 .....Difference equations  
 .....Integrodifferential equations  
 .....Maxwell equations  
 .....Nonlinear equations  
 .....Bifurcation  
 .....Polynomials  
 .....Riccati equations  
 ....Estimation  
 .....Estimation error  
 .....Estimation theory  
 .....Cramer-Rao bounds  
 .....Maximum a posteriori estimation  
 .....Life estimation  
 .....Maximum likelihood estimation  
 .....State estimation  
 .....Observers  
 .....Yield estimation  
 ....Euclidean distance  
 .....Hilbert space

....Finite difference methods  
 ....Finite element analysis  
 ....Fourier series  
 ....Functional analysis  
 ....Geometry  
 .....Computational geometry  
 .....Fractals  
 .....Elliptic curves  
 .....Elliptic design  
 .....Ellipsoids  
 .....Information geometry  
 .....Surface topography  
 .....Nanotopography  
 ....Gradient methods  
 ....Graph theory  
 .....Bipartite graph  
 .....Optimal matching  
 .....Reachability analysis  
 .....Shortest path problem  
 .....Tree graphs  
 ....Harmonic analysis  
 ....Iterative methods  
 .....Expectation-maximization algorithms  
 .....Iterative algorithms  
 .....Belief propagation  
 .....Iterative closest point algorithm  
 .....Sum product algorithm  
 ....Kernel  
 .....Null space  
 ....Laplace equations  
 ....Lattices  
 .....Lattice Boltzmann methods  
 ....Limit-cycles  
 ....Linearization techniques  
 ....Linear matrix inequalities  
 ....Linear systems  
 ....Mathematical model  
 .....Mathematical analysis  
 .....Formal concept analysis  
 .....Fractional calculus  
 .....Modal analysis  
 ....Mathematical programming  
 ....Method of moments  
 ....Minimization  
 .....Minimization methods  
 ....Mode matching methods  
 ....Network theory (graphs)

....Nonlinear equations  
 .....Bifurcation  
 ....Nonlinear systems  
 .....Chaos  
 .....Chaotic communication  
 .....Complexity theory  
 .....Spatiotemporal phenomena  
 .....Nonlinear dynamical systems  
 ....Numerical analysis  
 .....Adaptive mesh refinement  
 .....Approximation methods  
 .....Approximation error  
 .....Chebyshev approximation  
 .....Curve fitting  
 .....Extrapolation  
 .....Function approximation  
 .....Interpolation  
 .....Least squares approximations  
 .....Linear approximation  
 .....Perturbation methods  
 .....Convergence of numerical methods  
 .....Finite difference methods  
 .....Finite element analysis  
 .....Finite volume methods  
 .....Gradient methods  
 .....Independent component analysis  
 .....Iterative methods  
 .....Expectation-maximization algorithms  
 .....Iterative algorithms  
 .....Method of moments  
 .....Mode matching methods  
 .....Multigrid methods  
 .....Newton method  
 .....Numerical simulation  
 .....Numerical stability  
 .....Relaxation methods  
 .....Sparse matrices  
 .....Splines (mathematics)  
 .....Surface fitting  
 .....Response surface methodology  
 .....Symmetric matrices  
 .....Transmission line matrix methods  
 ....Optimization  
 .....Cost function  
 .....Optimal scheduling  
 .....Optimization methods  
 .....Circuit optimization

.....Design optimization  
 .....Gradient methods  
 .....H infinity control  
 .....Mathematical programming  
 .....Optimized production technology  
 .....Pareto optimization  
 .....Quadratic programming  
 .....Simulated annealing  
 ....Piecewise linear techniques  
 .....Piecewise linear approximation  
 ....Predator prey systems  
 ....Probability  
 .....Ant colony optimization  
 .....Bayes methods  
 .....Recursive estimation  
 .....Error probability  
 .....Forecasting  
 .....Demand forecasting  
 .....Economic forecasting  
 .....Technology forecasting  
 .....Memoryless systems  
 .....Pairwise error probability  
 .....Possibility theory  
 .....Probability distribution  
 .....Exponential distribution  
 .....Log-normal distribution  
 .....Maxwell-Boltzmann distribution  
 .....Nakagami distribution  
 .....Random variables  
 .....Statistical distributions  
 .....Distribution functions  
 .....Gaussian distribution  
 .....Weibull distribution  
 .....Uncertainty  
 ....Quaternions  
 ....Random processes  
 .....Brownian motion  
 ....Root mean square  
 ....Sequences  
 .....Binary sequences  
 .....Random sequences  
 ....Set theory  
 .....Fuzzy sets  
 .....Fuzzy set theory  
 .....Rough sets  
 ....Simulated annealing  
 ....Smoothing methods  
 ....Spirals  
 ....Statistics  
 .....Adaptive estimation  
 .....Autoregressive processes  
 .....Boltzmann distribution  
 .....Lattice Boltzmann methods  
 .....Correlation  
 .....Autocorrelation  
 .....Correlation coefficient  
 .....Covariance matrices  
 .....Gaussian mixture model  
 .....Higher order statistics  
 .....Histograms  
 .....Least squares methods  
 .....Least mean squares methods  
 .....Least squares approximations  
 .....Linear discriminant analysis  
 .....Maximum likelihood estimation  
 .....Mean square error methods  
 .....Minimax techniques  
 .....Parametric statistics  
 .....Prediction theory  
 .....Root mean square  
 .....Sampling methods  
 .....Compressed sensing  
 .....Nonuniform sampling  
 .....Statistical analysis  
 .....Analysis of variance  
 .....Mode matching methods  
 .....Monte Carlo methods  
 .....Parameter estimation  
 .....Pareto analysis  
 .....Principal component analysis  
 .....Regression analysis  
 .....Time series analysis  
 ....Stochastic processes  
 .....Gaussian processes  
 .....Gaussian mixture model  
 .....Markov processes  
 .....Markov random fields  
 ....Taylor series  
 ....Topology  
 ....Transforms  
 .....Discrete transforms  
 .....Discrete cosine transforms  
 .....Empirical mode decomposition  
 .....Fourier transforms

- .....Discrete Fourier transforms
- .....Fast Fourier transforms
- .....Karhunen-Loeve transforms
- .....Poincare invariance
- .....Wavelet transforms
- .....Biorthogonal modulation
- .....Continuous wavelet transforms
- .....Discrete wavelet transforms
- .....Wavelet coefficients
- .....Wavelet packets
- ....Transmission line matrix methods
- ....Uncertain systems
- ....Utility theory

### **Microwave theory and techniques**

- ....Microwave technology
- .....Beam steering
- .....Circulators
- .....Masers
- .....Gyrotrons
- .....Microwave bands
- .....C-band
- .....K-band
- .....L-band
- .....Microwave circuits
- .....Microwave communication
- .....Rectennas
- .....Microwave devices
- .....Masers
- .....Microwave amplifiers
- .....Microwave filters
- .....Microwave transistors
- .....Microwave generation
- .....High power microwave generation
- .....Microwave photonics
- .....Microwave sensors
- ....Millimeter wave technology
- .....Millimeter wave circuits
- .....Millimeter wave integrated circuits
- .....Millimeter wave communication
- .....Millimeter wave devices
- .....Millimeter wave transistors
- .....Millimeter wave integrated circuits
- .....MIMICs
- .....Millimeter wave radar

- ....Submillimeter wave technology
- .....Submillimeter wave circuits
- .....Submillimeter wave integrated circuits
- .....Submillimeter wave communication
- .....Submillimeter wave devices
- .....Submillimeter wave filters
- .....Submillimeter wave integrated circuits

### **Nanotechnology**

- ....Bionanotechnology
- ....Casimir effect
- ....Molecular computing
- ....Molecular electronics
- ....Nanobioscience
- .....DNA computing
- .....Nanobiotechnology
- ....Nanoelectromechanical systems
- ....Nanoelectronics
- ....Nanofabrication
- ....Nanofluidics
- ....Nanolithography
- ....Nanomaterials
- ....Nanopatterning
- .....Colloidal lithography
- ....Nanophotonics
- ....Nanopositioning
- ....Nanoscale devices
- .....Nanocontacts
- .....Nanotube devices
- ....Nanostructured materials
- .....Nanocomposites
- .....Nanoporous materials
- ....Nanostructures
- .....Nanoparticles
- .....Nanocrystals
- .....Nanotubes
- .....Carbon nanotubes
- .....Semiconductor nanotubes
- .....Nanowires
- .....Semiconductor nanostructures
- ....Self-assembly
- .....Electrostatic self-assembly
- ....Self-replicating machines

**Nuclear and plasma sciences**

- ....Biomedical applications of radiation
- ....Colliding beam devices
  - .....Colliding beam accelerators
  - .....Muon colliders
- ....Electron emission
  - .....Ballistic transport
  - .....Electronic ballasts
- ....Elementary particles
  - .....Charge carriers
    - .....Charge carrier density
    - .....Charge carrier lifetime
    - .....Charge carrier mobility
    - .....Charge carrier processes
    - .....Hot carriers
  - .....Electrons
    - .....Electron sources
    - .....Quantum wells
    - .....Trions
  - .....Elementary particle exchange interactions
  - .....Elementary particle vacuum
- ....Ions
  - .....Ionization
  - .....Ion sources
- ....Mesons
- ....Neutrino sources
- ....Neutrons
- ....Particle beams
  - .....Atomic beams
  - .....Electron beams
  - .....Ion beams
- ....Particle collisions
- ....Phonons
- ....Positrons
- ....Protons
- ....Fusion power generation
- ....Fusion reactors
  - .....Fusion reactor design
  - .....Tokamaks
    - .....Tokamak devices
- ....Gamma-rays
  - .....Gamma-ray bursts
  - .....Gamma-ray detection
  - .....Gamma-ray effects
- ....Gas discharge devices
  - .....Glow discharge devices
- ....High energy physics instrumentation computing
  - .....Linear particle accelerator
- ....Ion beam applications
  - .....Ion implantation
    - .....Plasma immersion ion implantation
- ....Ion emission
- ....Nuclear electronics
- ....Nuclear imaging
  - .....Energy resolution
- ....Nuclear medicine
- ....Nuclear physics
  - .....Alpha particles
  - .....Beta rays
  - .....Ignition
  - .....Ion sources
  - .....Isotopes
  - .....Nuclear phase transformations
  - .....Nuclear thermodynamics
  - .....Relativistic effects
- ....Particle accelerators
  - .....Accelerator magnets
  - .....Colliding beam accelerators
  - .....Cyclotrons
  - .....Electron accelerators
  - .....Ion accelerators
  - .....Linear accelerators
  - .....Photon collider
  - .....Plasma accelerators
  - .....Proton accelerators
  - .....Storage rings
  - .....Synchrocyclotrons
  - .....Synchrotrons
    - .....Synchrotron radiation
    - .....Undulators
- ....Particle beam handling
- ....Particle beam injection
- ....Plasmas
  - .....Atmospheric-pressure plasmas
  - .....Plasma applications
    - .....Plasma devices
      - .....Plasma immersion ion implantation
      - .....Plasma welding
    - .....Tokamaks
  - .....Plasma confinement
    - .....Inertial confinement
    - .....Magnetic confinement

- .....Plasma diagnostics
- .....Plasma properties
  - .....Dusty plasmas
  - .....Plasma chemistry
  - .....Plasma density
  - .....Plasma sheaths
  - .....Plasma stability
  - .....Plasma temperature
  - .....Plasmons
- .....Plasma simulation
- .....Plasma sources
- .....Plasma transport processes
- ....Radiation effects
  - .....Biological effects of radiation
  - .....Gamma-ray effects
  - .....Ion radiation effects
  - .....Neutron radiation effects
- ....Radiation hardening (electronics)
- ....Radiation monitoring
  - .....Radiation dosage
  - .....Radiation safety
- ....Reactor instrumentation
- ....Scintillation counters
  - .....Solid scintillation detectors
- ....Thermionic emission

### **Oceanic engineering and marine technology**

- ....Marine navigation
- ....Marine technology
  - .....Marine equipment
  - .....Marine transportation
  - .....Marine vehicles
  - .....Underwater cables
  - .....Underwater communication
  - .....Underwater equipment
  - .....Rebreathing equipment
  - .....Underwater structures
  - .....Underwater technology
  - .....Underwater communication
  - .....Underwater equipment
  - .....Underwater structures
- ....Oceanographic techniques
- ....Ocean temperature
- ....Water pollution
  - .....Marine pollution

### **Power electronics**

- ....Converters
  - .....Digital-to-frequency converters
  - .....Frequency conversion
  - .....Mixers
  - .....Optical frequency conversion
  - .....Power conversion
    - .....AC-DC power converters
    - .....DC-DC power converters
    - .....Matrix converters
    - .....Power conversion harmonics
  - .....Pulse width modulation converters
  - .....Static power converters
  - .....Wavelength converters
- ....Current limiters
  - .....Fault current limiters
- ....Inverters
  - .....Pulse inverters
  - .....Resonant inverters
- ....Phase control
- ....Power conditioning
  - .....Power smoothing
- ....Power semiconductor devices
  - .....Power transistors
  - .....Power semiconductor switches
    - .....Bipolar transistors
    - .....Insulated gate bipolar transistors
    - .....Kirk field collapse effect
  - .....Thyristors
  - .....Photothyristors
- ....Snubbers
- ....Three-phase electric power

### **Power engineering and energy**

- ....Electric variables control
  - .....Current control
  - .....Electrical ballasts
  - .....Electric current control
  - .....Gain control
  - .....Power control
  - .....Power system control
  - .....Bidirectional power flow
  - .....Load flow control
  - .....SCADA systems
  - .....Reactive power control



- .....Voltage control
- .....Automatic voltage control
- ....Energy
  - .....Energy barrier
  - .....Energy capture
  - .....Energy consumption
  - .....Energy conversion
    - .....Batteries
    - .....Fuel cells
    - .....Motors
    - .....Photovoltaic cells
    - .....Potential well
    - .....Solar heating
    - .....Thermoelectricity
    - .....Waste heat
  - .....Energy dissipation
  - .....Energy exchange
  - .....Energy harvesting
  - .....Energy management
    - .....Energy conservation
    - .....Energy efficiency
    - .....Load management
  - .....Energy resources
    - .....Fuels
      - .....Geothermal energy
      - .....Natural gas
      - .....Nuclear fuels
      - .....Solar energy
      - .....Wind energy
      - .....Wind farms
  - .....Energy states
    - .....Effective mass
    - .....Orbital calculations
  - .....Energy storage
    - .....Batteries
    - .....Flywheels
    - .....Fuel cells
    - .....Hydrogen storage
    - .....Supercapacitors
    - .....Superconducting magnetic energy storage
- ....Power engineering
  - .....Ferroresonance
  - .....High-voltage techniques
  - .....Power engineering computing
  - .....Power system simulation
  - ....Power generation
    - .....Automatic generation control
    - .....Cogeneration
    - .....Distributed power generation
    - .....Geothermal power generation
    - .....Hydroelectric power generation
      - .....Hydroelectric-thermal power generation
      - .....Microhydro power
      - .....Picohydro power
    - .....Magneto hydrodynamic power generation
    - .....Nuclear power generation
      - .....Fission reactors
      - .....Fusion power generation
    - .....Power generation dispatch
    - .....Power generation planning
    - .....Solar power generation
      - .....Maximum power point trackers
      - .....Photovoltaic systems
    - .....Trigeneration
    - .....Turbomachinery
    - .....Turbines
    - .....Turbogenerators
    - .....Wind energy generation
    - .....Wind power generation
  - ....Power systems
    - .....Hybrid power systems
    - .....Industrial power systems
    - .....Power distribution
      - .....Power distribution faults
      - .....Power distribution lines
    - .....Power grids
      - .....Microgrids
      - .....Smart grids
    - .....Power supplies
      - .....Current supplies
      - .....Emergency power supplies
    - .....Power demand
    - .....Power quality
    - .....Power system restoration
    - .....Switched-mode power supply
    - .....Traction power supplies
    - .....Umbilical cable
  - .....Power system analysis computing
  - .....Power system dynamics
  - .....Power system economics
  - .....Power system faults
  - .....Power system harmonics

- .....Power harmonic filters
- .....Power system management
- .....Load flow
- .....Power system measurements
- .....Meter reading
- .....Power system planning
- .....Power demand
- .....Power system protection
- .....Electrical safety
- .....Substation protection
- .....Surge protection
- .....Power system reliability
- .....Power system stability
- .....Power transmission
- .....Flexible AC transmission systems
- .....HVDC transmission
- .....Inductive power transmission
- .....Static VAr compensators
- .....Transmission lines
- .....PSCAD
- .....Pulse power systems
- .....Pulsed power supplies
- .....Reactive power
- .....Substations
- .....Substation automation
- .....Substation protection
- .....Transformers
- .....Current transformers
- .....Flyback transformers
- .....Instrument transformers
- .....Phase transformers
- .....Power transformers
- .....Pulse transformers
- .....Uninterruptible power systems

#### **Product safety engineering**

- ....Consumer protection
- ....Power system protection
- .....Electrical safety
- .....Grounding
- .....Substation protection
- .....Surge protection
- .....Arresters
- ....Safety
- .....Aerospace safety

- .....Air safety
- .....Domestic safety
- .....Emergency services
- .....Explosion protection
- .....Hazards
- .....Biohazards
- .....Chemical hazards
- .....Explosions
- .....Fires
- .....Flammability
- .....Floods
- .....Hazardous areas
- .....Hazardous materials
- .....Toxicology
- .....Health and safety
- .....Occupational health
- .....Occupational safety
- .....Marine safety
- .....Product safety
- .....Protection
- .....Explosion protection
- .....Lightning protection
- .....Radiation safety
- .....Safety devices
- .....Eye protection
- .....Protective clothing
- .....Vehicle safety
- ...Vehicle crash testing

#### **Professional communication**

- ....Collaboration
- .....Collaborative tools
- .....Call conference
- .....Collaborative software
- .....Videoconferences
- .....Discussion forums
- .....Teamwork
- .....Virtual groups
- ....Communication aids
- ....Communication effectiveness
- ....Communication symbols
- .....Semiotics
- .....Pragmatics
- .....Semantics
- .....Syntactics

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| ....Context                         | .....Social network services         |
| ....Databases                       | .....Computer mediated communication |
| .....Database systems               | .....Facebook                        |
| .....Audio databases                | .....LinkedIn                        |
| .....Deductive databases            | .....MySpace                         |
| .....Image databases                | .....Second Life                     |
| .....Indexes                        | .....Twitter                         |
| .....Multimedia databases           | .....YouTube                         |
| .....Object oriented databases      | .....Tagging                         |
| .....Query processing               | .....Tag clouds                      |
| .....Deductive databases            | .....Taxonomy                        |
| .....Distributed databases          | .....Terminology                     |
| .....Image databases                | .....Dictionaries                    |
| .....Image retrieval                | .....Video sharing                   |
| .....Multimedia databases           | .....Facebook                        |
| .....Object oriented databases      | .....MySpace                         |
| .....Relational databases           | .....YouTube                         |
| .....Spatial databases              | .....Vocabulary                      |
| .....Transaction databases          | .....Web sites                       |
| .....Itemsets                       | .....Facebook                        |
| .....Visual databases               | .....MySpace                         |
| ....Global communication            | .....Uniform resource locators       |
| .....Cross-cultural communication   | .....Web design                      |
| .....Geographic information systems | .....YouTube                         |
| .....Geospatial analysis            | ....Information science              |
| .....Gunshot detection systems      | ....Information services             |
| ....Grammar                         | .....Ask IEEE                        |
| ....Information analysis            | .....Dictionaries                    |
| .....Indexing                       | .....Document delivery               |
| ....Information resources           | .....Ask IEEE                        |
| ....Information retrieval           | .....Encyclopedias                   |
| .....Blogs                          | .....Libraries                       |
| .....Content-based retrieval        | .....Software libraries              |
| .....Hypertext systems              | .....Teletext                        |
| .....Information filtering          | .....Videotex                        |
| .....Information filters            | .....Wikipedia                       |
| .....Recommender systems            | ....Information systems              |
| .....Information rates              | .....Database systems                |
| .....Music information retrieval    | .....Audio databases                 |
| .....Online services                | .....Deductive databases             |
| .....Search engines                 | .....Image databases                 |
| .....Search methods                 | .....Indexes                         |
| .....Keyword search                 | .....Multimedia databases            |
| .....Metasearch                     | .....Object oriented databases       |
| .....Nearest neighbor searches      | .....Query processing                |
| .....Search problems                | .....Data systems                    |
| .....Web search                     | .....Data acquisition                |

- .....Data compression
- .....Data conversion
- .....Data engineering
- .....Data handling
- .....Data processing
- .....Data storage systems
- .....Data warehouses
- .....Distributed information systems
- .....Publish-subscribe
- .....Identity management systems
- .....Informatics
  - .....Biomedical informatics
  - .....Cognitive informatics
- .....Information architecture
- .....Information management
  - .....Competitive intelligence
  - .....Document handling
  - .....Information security
  - .....Information sharing
  - .....Knowledge transfer
  - .....Information processing
- .....Informatics
  - .....Information exchange
  - .....Sonification
- .....Management information systems
  - .....Portals
  - .....Medical information systems
    - .....Electronic medical records
- .....Information technology
  - .....Information representation
- .....Printing
  - .....Digital printing
  - .....Teleprinting
- .....Telematics
- .....Universal Serial Bus
- ....Manuals
- ....Oral communication
  - .....Public speaking
  - .....Speech
- ....Plagiarism
- ....Portfolios
- ....Professional societies
- ....Public speaking
- ....Rhetoric
- ....Writing
  - .....Abstracts
  - .....Bibliographies

- .....Biographies
  - .....Autobiographies
- .....Dictionaries
- .....Documentation
- .....Grammar
- .....Readability metrics
- .....Resumes
- .....Reviews
- .....Thesauri

### **Reliability**

- ....Availability
- ....Fault diagnosis
  - .....Dissolved gas analysis
  - .....Fault location
- ....Fault tolerance
  - .....Redundancy
- ....Fluctuations
- ....Integrated circuit reliability
- ....Maintenance
- ....Maldistribution
- ....Materials reliability
  - ....Reliability engineering
  - ....Reliability theory
- ....Robustness
  - ....Semiconductor device reliability
  - ....Software reliability
- ....Stability
  - .....Circuit stability
  - .....Robust stability
  - .....Stability analysis
    - .....Stability criteria
  - .....Thermal stability
- ....Telecommunication network reliability

### **Resonance**

- ....Ferroresonance
- ....Magnetic resonance
  - .....Nuclear magnetic resonance
  - .....Paramagnetic resonance
- ....Resonance light scattering
- ....Stochastic resonance

**Robotics and automation**

- ....Animatronics
- ....Automation
  - .....Automated highways
  - .....Automatic generation control
  - .....Automatic testing
    - .....Automatic test pattern generation
    - .....Ring generators
  - .....Manufacturing automation
    - .....Computer aided manufacturing
    - .....Computer integrated manufacturing
    - .....Computer numerical control
    - .....Flexible manufacturing systems
  - .....Office automation
    - .....Workflow management software
  - .....Storage automation
- ....Multi-robot systems
- ....Robots
  - .....Androids
  - .....Aquatic robots
  - .....Automata
    - .....Turing machines
  - .....Cognitive robotics
  - .....Computer vision
    - .....Active appearance model
    - .....Face detection
    - .....Smart cameras
  - .....Educational robots
  - .....Humanoid robots
  - .....Intelligent robots
  - .....Manipulators
    - .....End effectors
      - .....Manipulator dynamics
      - .....Micromanipulators
  - .....Medical robotics
    - .....Rehabilitation robotics
  - .....Mobile robots
    - .....Climbing robots
    - .....Legged locomotion
  - .....Orbital robotics
  - .....Parallel robots
  - .....Robot control
    - .....Robot motion
    - .....Robot kinematics
      - .....Motion analysis
  - .....Robot programming
  - .....Robot sensing systems

- .....Robot vision systems
- .....Simultaneous localization and mapping
- .....Tactile sensors
- .....Service robots
- .....Telerobotics
- .....Teleoperators

**Science - general**

- ....Astronomy
  - .....Astrophysics
  - .....Observatories
  - .....Orbits (stellar)
  - .....Planets
    - .....Earth
      - .....Extrasolar planets
      - .....Jupiter
      - .....Mars
      - .....Mercury (planets)
      - .....Pluto
      - .....Saturn
      - .....Sun
      - .....Venus
    - .....Radio astronomy
    - .....Solar system
      - .....Kuiper belt
    - .....Stellar dynamics
      - .....Stellar motion
- ....Biology
  - .....Biochemistry
    - .....Amino acids
    - .....Biochemical analysis
    - .....Peptides
    - .....Proteins
  - .....Biodiversity
    - .....Biogeography
  - .....Bioelectric phenomena
    - .....Electric shock
  - .....Biological cells
    - .....Cells (biology)
    - .....Chromosome mapping
    - .....Fibroblasts
    - .....RNA
    - .....Stem cells
  - .....Biological information theory
  - .....Biological processes

|                                 |                                 |
|---------------------------------|---------------------------------|
| .....Biological interactions    | .....Proteins                   |
| .....Chronobiology              | .....Chemical analysis          |
| .....Circadian rhythm           | .....Activation analysis        |
| .....Coagulation                | .....Chemical processes         |
| .....Symbiosis                  | .....Chemicals                  |
| .....Biological system modeling | .....Electronic noses           |
| .....Biological systems         | .....pH measurement             |
| .....Anatomy                    | .....Chemical compounds         |
| .....Molecular communication    | .....Anti-freeze                |
| .....Organisms                  | .....Ethanol                    |
| .....Biology computing          | .....Methanol                   |
| .....Biophotonics               | .....Inorganic chemicals        |
| .....Biophysics                 | .....Organic chemicals          |
| .....Aerospace biophysics       | .....Hydrocarbons               |
| .....Biomagnetics               | .....Photochemistry             |
| .....Cellular biophysics        | .....Photobleaching             |
| .....Molecular biophysics       | ....Electricity                 |
| .....Evolution (biology)        | .....Photoelectricity           |
| .....Memetics                   | .....Photovoltaic effects       |
| .....Phylogeny                  | .....Piezoelectricity           |
| .....Genetics                   | .....Piezoelectric effect       |
| .....DNA                        | .....Piezoelectric polarization |
| .....Gene therapy               | .....Pyroelectricity            |
| .....Genetic communication      | .....Thermoelectricity          |
| .....Genetic expression         | .....Electrothermal effects     |
| .....Genetic programming        | .....Thermoelectric devices     |
| .....Genomics                   | .....Triboelectricity           |
| .....Microinjection             | ....Geoscience                  |
| .....Nanobioscience             | .....Antarctica                 |
| .....DNA computing              | .....South Pole                 |
| .....Nanobiotechnology          | .....Arctic                     |
| .....Physiology                 | .....North Pole                 |
| .....Predator prey systems      | .....Atmosphere                 |
| .....Synthetic biology          | .....Atmospheric modeling       |
| .....Systematics                | .....Atmospheric waves          |
| .....Systems biology            | .....Biosphere                  |
| .....Vegetation                 | .....Continents                 |
| .....Crops                      | .....Africa                     |
| .....Marine vegetation          | .....Asia                       |
| .....Zoology                    | .....Australia                  |
| .....Animals                    | .....Europe                     |
| ....Chemistry                   | .....North America              |
| .....Astrochemistry             | .....South America              |
| .....Biochemistry               | .....Cyclones                   |
| .....Amino acids                | .....Hurricanes                 |
| .....Biochemical analysis       | .....Tropical cyclones          |
| .....Peptides                   | .....Typhoons                   |

|                                 |                                 |
|---------------------------------|---------------------------------|
| .....Earth                      | .....Planetary volcanoes        |
| .....Earthquakes                | .....Volcanic activity          |
| .....Earthquake engineering     | .....Volcanic ash               |
| .....Forestry                   | ....Metrology                   |
| .....Geography                  | ....Physics                     |
| .....Cities and towns           | .....Acoustics                  |
| .....Rural areas                | .....Acoustic applications      |
| .....Urban areas                | .....Acoustic devices           |
| .....Geology                    | .....Acoustic emission          |
| .....Minerals                   | .....Acoustic noise             |
| .....Rocks                      | .....Acoustic propagation       |
| .....Geophysics                 | .....Acoustic pulses            |
| .....EMTDC                      | .....Acoustic waves             |
| .....Extraterrestrial phenomena | .....Acoustooptic effects       |
| .....Geodynamics                | .....Biomedical acoustics       |
| .....Geophysics computing       | .....Cepstral analysis          |
| .....Meteorology                | .....Music                      |
| .....Moisture                   | .....Nonlinear acoustics        |
| .....Seismology                 | .....Psychoacoustics            |
| .....Surface waves              | .....Reverberation              |
| .....Well logging               | .....Spectral shape             |
| .....Ice                        | .....Underwater acoustics       |
| .....Ice shelf                  | .....Astrophysics               |
| .....Ice surface                | .....Beams                      |
| .....Ice thickness              | .....Acoustic beams             |
| .....Sea ice                    | .....Laser beams                |
| .....Lakes                      | .....Molecular beams            |
| .....Land surface               | .....Optical beams              |
| .....Levee                      | .....Particle beams             |
| .....Meteorological factors     | .....Biophysics                 |
| .....Oceans                     | .....Aerospace biophysics       |
| .....Ocean salinity             | .....Biomagnetics               |
| .....Ocean temperature          | .....Cellular biophysics        |
| .....Sea coast                  | .....Molecular biophysics       |
| .....Sea floor                  | .....Dark energy                |
| .....Sea level                  | .....Entropy                    |
| .....Sea surface                | .....Fluid flow                 |
| .....Tides                      | .....Fluid dynamics             |
| .....Rivers                     | .....Hydraulic diameter         |
| .....Sediments                  | .....Hydrology                  |
| .....Soil                       | .....Pipelines                  |
| .....Soil moisture              | .....Valves                     |
| .....Soil properties            | .....Geophysics                 |
| .....Soil texture               | .....EMTDC                      |
| .....Tornadoes                  | .....Extraterrestrial phenomena |
| .....Tsunami                    | .....Geodynamics                |
| .....Volcanoes                  | .....Geophysics computing       |

.....Meteorology  
 .....Moisture  
 .....Seismology  
 .....Surface waves  
 .....Well logging  
 .....Kinetic theory  
 .....Kinetic energy  
 .....Levitation  
 .....Electrostatic levitation  
 .....Magnetic levitation  
 .....Lorentz covariance  
 .....Mechanical factors  
 .....Acceleration  
 .....Aerodynamics  
 .....Biomechanics  
 .....Damping  
 .....Dynamics  
 .....Fatigue  
 .....Force  
 .....Friction  
 .....Hydrodynamics  
 .....Kinematics  
 .....Lubrication  
 .....Magnetohydrodynamics  
 .....Photoelasticity  
 .....Pressure effects  
 .....Shock (mechanics)  
 .....Strain  
 .....Stress  
 .....Surface cracks  
 .....Torque  
 .....Vibrations  
 .....Volume relaxation  
 .....Workability  
 .....Network theory (graphs)  
 .....Orbits  
 .....Physics education  
 .....Quantum mechanics  
 .....Density functional theory  
 .....Lagrangian functions  
 .....Proton effects  
 .....Quantum capacitance  
 .....Quantum entanglement  
 .....Relativistic quantum mechanics  
 .....Schrodinger equation  
 .....Stationary state  
 .....Teleportation  
 .....Tunneling  
 .....String theory  
 .....Thermal factors  
 .....Temperature  
 .....Temperature dependence  
 .....Thermal conductivity  
 .....Thermal expansion  
 .....Thermal management  
 .....Thermal stresses  
 .....Thermoelasticity  
 .....Thermoelectricity  
 .....Thermolysis  
 .....Thermooptic effects  
 .....Thermoresistivity  
 .....Waves  
 .....Atmospheric waves  
 .....Berry phase  
 .....Doppler effect  
 .....Electrodynamics  
 .....Magnetostatic waves  
 .....Matter waves  
 .....Plasma waves  
 .....Propagation  
 .....Reflectivity  
 .....Seismic waves  
 .....Shock waves  
 .....Solitons  
 .....Surface acoustic waves  
 .....Wave functions  
 ....Sociology  
 .....Digital divide  
 ....Thermodynamics  
 .....Isobaric  
 .....Isothermal processes

**Sensors**  
 ....Acoustic sensors  
 ....Chemical and biological sensors  
 .....Biosensors  
 .....Gas detectors  
 .....Amperometric sensors  
 ....Electromechanical sensors  
 .....Microsensors  
 ....Force sensors  
 ....Infrared sensors



- ....Intelligent sensors
- ....Intracranial pressure sensors
- ....Ionizing radiation sensors
  - .....Position sensitive particle detectors
  - .....Radiation detectors
    - .....Bolometers
    - .....Gamma-ray detectors
    - .....Infrared detectors
    - .....Photodetectors
    - .....Semiconductor radiation detectors
    - .....Silicon radiation detectors
    - .....X-ray detectors
- ....Magnetic sensors
  - .....Spin valves
- ....Mechanical sensors
  - .....Capacitive sensors
- ....Multimodal sensors
- ....Optical sensors
  - .....Optical detectors
    - .....Bar codes
    - .....Optical fiber sensors
- ....Optoelectronic and photonic sensors
- ....Sensor phenomena and characterization
- ....Sensor systems and applications
  - .....Detectors
    - .....Envelope detectors
    - .....Semiconductor detectors
  - .....Electric sensing devices
    - .....Leak detection
  - .....Radiofrequency identification
    - .....RFID tags
  - .....Robot sensing systems
    - .....Robot vision systems
  - .....Simultaneous localization and mapping
  - .....Tactile sensors
  - .....Sensor arrays
  - .....Sensor fusion
  - .....Sensor systems
    - .....Gunshot detection systems
- ....Thermal sensors
  - .....Temperature sensors
- ....Thick film sensors
- ....Thin film sensors
- ....Wearable sensors

### Signal processing

- ....Acoustic signal processing
  - .....Active noise reduction
  - .....Echo cancellers
  - .....Speech processing
    - .....Human voice
    - .....Speech enhancement
    - .....Speech synthesis
- ....Adaptive signal processing
  - .....Adaptive filters
  - .....Adaptive signal detection
- ....Amplifiers
  - .....Broadband amplifiers
  - .....Cavity resonators
    - .....Laser cavity resonators
  - .....Differential amplifiers
  - .....Distributed amplifiers
  - .....Low-noise amplifiers
  - .....Operational amplifiers
    - .....Feedback amplifier
    - .....Power amplifiers
      - .....High power amplifiers
    - .....Predistortion
  - .....Preamplifiers
  - .....Pulse amplifiers
  - .....Radiofrequency amplifiers
- ....Array signal processing
- ....Attenuators
  - .....Optical attenuators
- ....Chirp
- ....Convolution
  - .....Convolvers
- ....Decorrelation
- ....Digital signal processing
  - .....Delta modulation
    - .....Delta-sigma modulation
    - .....Sigma-delta modulation
  - .....Digital signal processing chips
- ....Dispersion
  - .....Chromatic dispersion
  - .....Optical fiber dispersion
- ....Distortion
  - .....Acoustic distortion
  - .....Four-wave mixing
  - .....Jitter
    - .....Timing jitter
  - .....Nonlinear distortion

- .....Harmonic distortion
- .....Intermodulation distortion
- .....Phase distortion
- ....Error correction
- .....Forward error correction
- ....Fading
- .....Frequency-selective fading channels
- .....Rayleigh channels
- .....Weibull fading channels
- ....Filters
- .....Active filters
- .....Band-pass filters
- .....Anisotropic
- .....Bragg gratings
- .....Fiber gratings
- .....Channel bank filters
- .....Digital filters
- .....Finite impulse response filters
- .....Equalizers
- .....Adaptive equalizers
- .....Blind equalizers
- .....Decision feedback equalizers
- .....Filtering theory
- .....Gabor filters
- .....Harmonic filters
- .....IIR filters
- .....Kalman filters
- .....Low-pass filters
- .....Matched filters
- .....Microstrip filters
- .....Nonlinear filters
- .....Particle filters
- .....Power filters
- .....Spurline
- .....Resonator filters
- .....Spatial filters
- .....Superconducting filters
- .....Transversal filters
- ....Frequency locked loops
- ....Geophysical signal processing
- ....Limiting
- ....Modulation
- .....Amplitude modulation
- .....Amplitude shift keying
- .....Quadrature amplitude modulation
- .....Chirp modulation
- .....Demodulation
- .....Digital modulation
- .....Constellation diagram
- .....Partial response signaling
- .....Frequency modulation
- .....Frequency shift keying
- .....Magnetic modulators
- .....Modulation coding
- .....Interleaved codes
- .....Optical modulation
- .....Electrooptic modulators
- .....Intensity modulation
- .....Phase modulation
- .....Continuous phase modulation
- .....Differential phase shift keying
- .....Phase shift keying
- .....Pulse modulation
- .....Pulse width modulation
- .....Pulse width modulation inverters
- .....Space vector pulse width modulation
- ....Multidimensional signal processing
- .....Video signal processing
- .....Video coding
- .....Video compression
- ....Noise
- .....1f noise
- .....Additive noise
- .....Additive white noise
- .....AWGN
- .....Colored noise
- .....Gaussian noise
- .....AWGN
- .....Laser noise
- .....Laser feedback
- .....Low-frequency noise
- .....Noise cancellation
- .....Phase noise
- .....Signal to noise ratio
- .....PSNR
- .....Superconducting device noise
- .....White noise
- .....AWGN
- ....Optical signal processing
- .....Laser noise
- .....Laser feedback
- ....Optical wavelength conversion
- ....Phase locked loops
- ....Pulse compression methods

- .....Optical pulse compression
- ....Pulse shaping methods
- .....Optical pulse shaping
- ....Quantization (signal)
- .....Vector quantization
- ....Radar signal processing
- ....Recording
- .....Audio recording
- .....Digital recording
- .....Disk recording
- .....Magnetic recording
- .....Digital magnetic recording
- .....Heat-assisted magnetic recording
- .....Magnetic noise
- .....Magneto-optic recording
- .....Microwave-assisted magnetic recording
- .....Perpendicular magnetic recording
- .....Optical recording
- .....CD recording
- .....Video recording
- .....High definition video
- .....Webcams
- ....RF signals
- ....Signal analysis
- .....Discrete-event systems
- .....Harmonic analysis
- .....Parameter estimation
- .....Amplitude estimation
- .....Direction-of-arrival estimation
- .....Frequency estimation
- .....Motion estimation
- .....Phase estimation
- .....Time of arrival estimation
- .....Signal mapping
- .....Spectral analysis
- .....Infrared spectra
- .....Judd-Ofelt theory
- .....Spectroradiometers
- ....Signal design
- ....Signal detection
- .....Acoustic signal detection
- .....Sonar detection
- .....Motion detection
- .....Multiuser detection
- .....Optical signal detection
- .....Phase detection
- .....Phase frequency detector

- .....Radar detection
- ....Signal generators
- .....Noise generators
- .....Pulse generation
- .....Optical pulse generation
- ....Signal reconstruction
- .....Signal denoising
- ....Signal resolution
- .....Diversity reception
- ....Signal restoration
- ....Signal sampling
- ....Signal synthesis
- ....Source separation
- .....Blind source separation
- ....Spectrogram
- ....Tracking loops

### **Social implications of technology**

- ....Cultural differences
- ....Environmental factors
- .....Biosphere
- .....Ecosystems
- .....Environmental economics
- .....Carbon tax
- .....Environmental monitoring
- .....Global warming
- .....Green products
- .....Green buildings
- .....Green cleaning
- .....Pollution
- .....Air pollution
- .....Industrial pollution
- .....Land pollution
- .....Oil pollution
- .....Radioactive pollution
- .....Thermal pollution
- .....Urban pollution
- .....Water pollution
- ....Ethical aspects
- ....Globalization
- ....International relations
- ....Peace technology
- ....Philosophical considerations
- ....Social factors
- .....Demography

- .....Technology social factors
  - .....Privacy
- ....Sustainable development
- ....Technology
  - .....Appropriate technology
  - .....Technological innovation
  - .....Technology social factors
    - .....Privacy
  - .....Technology transfer
  - .....Small business technology transfer

### **Solid state circuits**

- ....Circuit subsystems
- ....Circuit theory
- ....FET circuits
  - .....FET integrated circuits
    - .....Field effect MMIC
      - .....MESFET integrated circuits
    - .....JFET circuits
      - .....JFET integrated circuits
    - .....MESFET circuits
      - .....MESFET integrated circuits
    - .....MODFET circuits
      - .....MODFET integrated circuits
    - .....MOSFET circuits
      - .....CMOSFET circuits
      - .....MOS integrated circuits
    - .....Power MOSFET
  - ....Gate leakage
  - ....Solid state circuit design
  - ....Transistors
    - .....Field effect transistors
      - .....CNTFETs
        - .....Double-gate FETs
          - .....HEMTs
          - .....JFETs
          - .....MESFETs
          - .....MISFETs
          - .....MODFETs
          - .....MOSFET
          - .....MOSHFETs
          - .....OFETs
            - .....Schottky gate field effect transistors
            - .....Thin film transistors
        - .....Heterojunction bipolar transistors

- .....Double heterojunction bipolar transistors
- .....Millimeter wave transistors
- .....Phototransistors

### **Superconductivity**

- ....Bean model
- ....Critical current density (superconductivity)
  - .....Critical current density
  - .....Flux pinning
- ....Superconducting devices
  - .....Josephson junctions
  - .....SQUIDs
    - .....Superconducting coils
    - .....Superconducting magnets
    - .....Superconducting microwave devices
    - .....Superconducting photodetectors
- ....Superconducting filaments and wires
- ....Superconducting films
  - .....Superconducting thin films
- ....Superconducting integrated circuits
- ....Superconducting magnetic energy storage
- ....Superconducting materials
  - .....Granular superconductors
  - .....High-temperature superconductors
    - .....Yttrium barium copper oxide
  - .....Multifilamentary superconductors
  - .....Niobium-tin
  - .....Type II superconductors
- ....Superconducting transition temperature

### **Systems engineering and theory**

- ....Adaptive systems
  - .....Adaptive control
  - .....Line enhancers
- ....Multi-agent systems
- ....Variable structure systems
  - .....Hierarchical systems
  - .....Multilevel systems
- ....Modeling
  - .....Analytical models
  - .....Atmospheric modeling
  - .....Brain modeling

- .....Computational modeling
- .....Computational cultural modeling
- .....Context modeling
- .....Data models
- .....Deformable models
- .....Digital elevation models
- .....Emulation
- .....Graphical models
- .....Green's function methods
- .....Hidden Markov models
- .....Input variables
- .....Integrated circuit modeling
  - .....Cutoff frequency
- .....Inverse problems
  - .....Deconvolution
- .....Load modeling
- .....Metamodeling
- .....Numerical models
- .....Object oriented modeling
- .....Power system modeling
  - .....Load modeling
- .....Semiconductor device modeling
- .....Semiconductor process modeling
- .....Signal representation
- .....Simulation
  - .....Computer simulation
  - .....Digital simulation
  - .....Medical simulation
- .....Solid modeling
- .....System identification
- ....Multidimensional systems
- ....Reduced order systems
- ....Stochastic systems
- ....System analysis and design
  - .....Asymptotic stability
  - .....Control system analysis
    - .....State-space methods
  - .....Diakoptics
- .....Distributed processing
  - .....Message passing
- .....Distributed vision networks
- .....Fault detection
- .....Fault tolerant systems
- .....Interconnected systems
- .....Large-scale systems
- .....Lyapunov methods
- .....Open systems

- .....Physical layer
- .....Petri nets
- .....Robust control
- .....Scalability
- .....Scattering parameters
- .....Sequential analysis
- .....Sequential diagnosis
- .....Software prototyping
- .....System-level design
- .....System performance
  - .....Cooperative caching
- .....Time factors
  - .....Continuous time systems
  - .....Discrete-time systems
  - .....Time invariant systems
  - .....Time-varying systems
- ....Systems engineering education

### **Systems, man, and cybernetics**

- ....Behavioral science
  - .....Animal behavior
  - .....Cognition
  - .....Consumer behavior
  - .....Psychiatry
    - .....Mental disorders
  - .....Psychology
    - .....Industrial psychology
  - .....Mood
    - .....Psychometric testing
- ....Biological control systems
  - .....Biomarkers
    - .....Molecular biomarkers
- ....Computational linguistics
- ....Cybernetics
  - .....Adaptive systems
    - .....Adaptive control
  - .....Line enhancers
  - .....Multi-agent systems
  - .....Variable structure systems
- .....Cognitive informatics
- .....Cognitive science
  - .....Problem-solving
- .....Control theory
  - .....Control nonlinearities
  - .....Observability

- .....Decision theory
- .....Decision trees
- .....Econophysics
- .....Emergent phenomena
- .....Intelligent control
- .....Feedforward systems
- .....Neurocontrollers
- .....Linear feedback control systems
- .....Frequency locked loops
- .....Phase locked loops
- .....State feedback
- .....Tracking loops
- ....Ergonomics
- .....Job design
- ....Human factors
- .....Affective computing
- .....Anthropomorphism
- ....Identification of persons
- .....Biometrics (access control)
- .....Gait recognition
- .....Iris recognition
- .....Face recognition
- .....Fingerprint recognition
- .....Handwriting recognition
- .....Forgery
- .....Speaker recognition
- .....Speech recognition
- .....Automatic speech recognition
- .....Speech analysis
- ....Man machine systems
- .....Interactive systems
- ....Natural languages
- .....Natural language processing
- .....Morphology
- ....Pervasive computing
- .....Ubiquitous computing
- .....Context-aware services
- .....Wearable computers
- ....Posthuman
- ....Teleworking
- ....Transhuman
- ....User interfaces
- .....Audio user interfaces
- .....Brain-computer interfaces
- .....Data visualization
- .....Isosurfaces
- .....Emotion recognition

- .....Exoskeletons
- .....Graphical user interfaces
- .....Avatars
- .....Human computer interaction
- .....Human-robot interaction
- .....Smart cards

### **Ultrasonics, ferroelectrics, and frequency control**

- ....Ferroelectric materials
- .....Ferroelectric films
- .....Relaxor ferroelectrics
- ....Frequency control
- .....Automatic frequency control
- .....Tunable circuits and devices
- .....RLC circuits
- .....Tuned circuits
- .....Tuning
- .....Laser tuning
- .....Optical tuning
- .....Tuners
- ....Piezoelectricity
- .....Piezoelectric effect
- .....Piezoelectric polarization
- ....Pyroelectricity
- ....Ultrasonic imaging
- .....Ultrasonography
- .....Sonogram
- ....Ultrasonic transducers

### **Vehicular and wireless technologies**

- ....Automotive engineering
- .....Automotive applications
- .....Automotive electronics
- .....Power steering
- .....Vehicle crash testing
- .....Vehicle detection
- .....Vehicle driving
- .....Vehicle dynamics
- .....Vehicle safety
- ....Land mobile radio equipment
- .....Mobile antennas
- ....Navigation

- .....Aircraft navigation
- .....Course correction
- .....Dead reckoning
- .....Inertial navigation
- .....Marine navigation
- .....Radio navigation
- .....Satellite navigation systems
  - .....Global Positioning System
  - .....Satellite constellations
- .....Sonar navigation
- ....Propulsion
  - .....Aircraft propulsion
    - .....Propellers
    - .....Electromagnetic launching
      - .....Coilguns
      - .....Railguns
    - .....Electrothermal launching
  - .....Rockets
- ....Vehicles
  - .....Land vehicles
    - .....Bicycles
    - .....Electric vehicles
    - .....Road vehicles
  - .....Remotely operated vehicles
    - .....Unmanned aerial vehicles
  - .....Space vehicles
    - .....Space shuttles
- ....Wireless sensor networks
  - .....Body sensor networks
  - .....Event detection