IFAC KEYWORD LIST OF CONTROL TERMINOLOGY

А Absolute error criterion measurement stability AC conductivity converter machines losses wires machines tacho generators Accelerometers Access times Accuracy Active brake control compensation control elements filters narrow band suspension noise control vehicle suspension Actuating signals Actuators Ada tasking programs Adaptation Adaptive algorithms arravs control correlation digital filters equalization equalizers filters svstems A/D converters Add-subtract time Adders Address registers spaces Addressable location addressing Addresses Adjacency Adjustment Admittance Aerospace computer control control engineering trajectories Affine Agents Agile control manufacturing Agriculture Air pollution traffic control Aircraft control operations Alarm systems Algebraic approaches Riccati equations selection systems theory Algorithmic languages Algorithms All pass elements filters Alternating magnetic fields Ambient noise Amplidyne Amplification Amplifiers Amplifier systems Amplifying elements Amplitude distortion locus

response Analog computer control computers control multipliers signals/digital converters Analysis of variance Analytic approximations AND elements operations Angular acceleration deviation frequency momentum position velocity Antennas Antilock braking systems Antiskid control devices Anti-spin regulation Anti-wheelspin control Applied neural control Approximate analysis Arc resistance Architectures Arithmetic algorithms and logic units Arm movements singularities ARMA models parameter estimation Armatures Array filters processors Artificial intelligence Assemblers Assembly language robots Astatic control Asymptotic analysis approximation properties stability Asynchronous sequential logic Attenuation correction observations Attenuators Attitude algorithms control gyros Attractors Authentication Auto correlation functions Automata theory Automated guided vehicles Automatic control (closed-loop) engineering (open-loop) systems controllers frequency control gain control operation people models process control (closed-loop) (open-loop) recognition regulators

modulation

restart sequence control testing Automation Automobile industry Automobiles Automorphism Automotive control emissions Autonomous control mobile robots vehicles Autoregressive models Autotransductors Autotuners Availability Available time Average values Averaging control

B

Backlash Backpropagation algorithms Backtracking Back-up controllers svstems Bad data identification Bandpass filters Bandwidth allocation voice networks coaxial probes electrical pulses measurements minimization problems Bang-bang control Bank switching Banvan networks Batch control modes Baud rates Bearings only tracking Behaviour Behavioural science Benchmark examples Bessel functions Bias winding Bilinear control systems transformations Binary arravs coded decimal codes control decision systems elements images logic systems search trees signals storage elements tree architectures trees Binding Bio control Biocybernetics Biomedical control systems Bionics Biotechnology Bispectrum estimation Bistability devices Bistable multivibrators Bistable trigger elements

Block diagrams Blow moulding Bode diagrams Boilers Bolometers Bond graphs Boolean algebra functions logic operations Boundary conditions detection element method integral formulation value problem Bounded disturbances noise Bounding method Brain models Brakes Branches Breadth-first searches Breakpoints Bridges Brownian motion Brushless motors Bubbles Buffer amplifiers storage Bugs Business process engineering Bus multiprocess or systems Butterworth filter Bypass clutch control

Blackboard architectures

C

Cables Cableway systems Cache coherence protocols memories Caches CAD/CAM models Calculators Calculus Calibration CAM Cameras Cancellation Capacitance Capacitive compensation Capacitively loaded junctions Capacitor filters Capacitors Capacity Cartesian manipulators products Cascade compensation control exciters CASE Catastrophe theory Categorical data Cathode follower ray tubes CD ROM Cellular automation logic neural networks Central processing units processors

Centralised control Centre of mass Centrifugal governors Certainty Chaos theory Chaotic behaviour Character recognition Characteristic curves eauation impedance polynomials roots time vector Characters Charge amplifiers Chassis control dynamometers Chattering Cheap control Checkpointing Checkpoints Checksums Check valves Chemical industry microsensors sensors variables control Cholesky factorization Chopper amplifiers Circuit models performance simulation switched networks Circuits Classification Classifiers Clocking Clocks Clock synchronization Closed-loop control controllers gain identification phase angles systems transfer functions Closed loops Closed queuing networks CMAC CNC Coarse-fine control relays switches Code converters Coded modulation Coders Coding schemes Coefficient of stability perturbation Cognitive science systems Coils Coloured noise Combinational circuits networks Combinatorial circuits mathematics switching Command and control systems control signals variables Communication channels

control applications

environments networks protocols systems Communications systems Compact spectra Companion matrices Comparators Comparing elements Compatibility Compensating elements feedback feedforward winding Compensation Compensators Compiler optimizations Compilers Complementarity problems Complementary code feedback formulations functions Complements Complete controllability Complex perturbation planes systems variables Components Compound actions controllers semiconductors Compounding feedback feedforward Compressors Computational methods Computed torque control Computer -aided circuit design control system design design diagnosis engineering instruction manufacturing system design testing work applications architectures communication networks control controlled systems experiments graphics hardware -integrated enterprises manufacturing interfaces networks programming programs recreations simulation software subroutines systems tomography vision Computers Computing elements linkages systems Concentrators Conceptual representations Concurrency control Concurrent architectures engineering programs searches

svstems Condition numbers Conditional probability stahility Conductivity Conductors Configuration control management space stability Conformal mapping techniques Conjugate gradient method points roots Conjunction Connected parallel computers Connectionism Connections Connective instability stability Connectivity Consistency Consoles Constant of inertia Constrained parameters poles Constraints Constraint satisfaction problems Contact resistance Continued fraction expansions Continuity Continuous action controllers control path control phase modulation speech recognition systems time filters time systems variables Continuously variable transmission Control accuracy actions algorithms applications circuits (closed-loop) education engineering applications of computers equations equipment errors functions instants laws loops nonlinearities (open-loop) oriented models panels points . precision . ranges schemes stations system analysis design synthesis svstems technology theory units valves windings Controllability Controlled conditions

devices systems variables Controller modulators vehicles Controllers Controlling elements machines power stations Conventional control Convergence analysis factors of numerical methods proofs Convergent control series Conversion Converters Convex optimisation programming projections Convolution integral Co-operation Co-operative control Co-ordinate time transformations Co-ordinates Co-ordination Co-ordinator Coprime factorization Coprocessor Copy Copyright Corner frequencies Corona discharges Coronas Corporate strategies Correcting conditions feedback , feedforward ranges variables Correction times Corrective actions Correlation coefficients Cosine transforms Coulomb damping friction Counters Coupled devices mode analysis mode theory Coupling coefficients functions losses models Covariance matrices Criterion functions Critical areas current density damping path analysis points state models Cross correlation functions Crossover frequency Cross-phase modulation Crosstalk interference Cruise control Cryogenic temperatures Cultural aspects of automation Current amplifiers comparators decay densities distributions

gains losses regulators transformers voltage characteristics Cursors Curves Cut-off frequencies rates Cybernetics Cycle length

D

D/A converters Damage Dampers Damping coefficients constants factors ratios Dashpots Data acquisition compression compression algorithms flow analysis flow diagrams flows fusion handling systems hold loggers logging models privacy processing processors recorders reduction replication sets storage streams symbols transmission Database management systems structures systems Databases Dead band Dead-beat control Deadlines Deadlock Dead zones Debugging Decay Decentralized control systems Decision block decoders circuits feedback equalization fusion making support systems tables theory trees Decoders Decomposable searching problems Decomposition methods theorems Deconvolution Decoupled subsystems Decoupling precompensators problems zeros Decrepitation Definite corrective action Degenerative feedback Delay

analysis circuits compensation demodulation elements estimation lines spread modulation Delivery systems Demodulators Density measurements Derivative action elements Describing functions Descriptor systems Desensitization Design systems VLSI Detecting elements Detection algorithms systems Detector performance saturation Detectors Determinism Deterministic behaviour systems Device degradation simulation simulators Developing countries Diagnosis Diagnostic inference programs tests Diagonal dominance Diagrams Dialogue Diaphragm actuators valves Diaphragms Diesel engines Difference amplifiers analysis equations Differential analyzers detection equations field rotors gain games gaps gears geometric methods geometry relays transformers Differentiating actions elements Differentiators Digital circuits communications computer applications computers control conversion techniques converters differential analysers filter processors filter structures filters images mobile radios patterns radios signal processors signals simulation

systems

VTR Digitisers Diluted magnetic semiconductors Dimensional systems transfer functions Dirac functions Direct digital control -drive robots dynamic problem Fourier reconstruction frequency modulation kinematic problem overwrite Directed graphs Discontinuities Discontinuous action control Discrete cosine transform digital dynamic control -event dynamic systems -event systems Fourier transforms measurements systems time time detection -time systems Discretization Discriminant analysis Discrimination Discriminators Disk memory Disks Displacement cascades transducers Displays Distance transformations velocity lag Distillation columns Distributed amplifiers artificial intelligence computer control systems control databases detection feedback models non-linear elements parameters -parameter systems simulation Distribution automation control feeders networks readout systems systems Distributions Disturbance localization parameters rejection signals variables District heating Disturbance rejection Dither Dividers Division Documentation Documents Domain analysis Domains Dominant points roots Drag cup motors DRAM Drawings Drift rate velocitv Driver

behaviour models Drivers Drives Driving voltage Drum memory Drv friction Dual composition control Dual-computer systems Dual-mode control Duality Duplex control Duty cycles factors Dvnamic behaviour bias control channel assignment decoupling degradation modelling models output feedback programming properties . range stability systems tests Dynamics

E

Dynamometers

Ecology Economic design systems Economics Eddy current analysis problems techniques currents Education Educational aids Effect device power Effect devices Effect transistor structures Effective bandwidth channel length cut-off wavelength deadtime mass range Efficiency enhancement Efficient algorithms evaluation Eigenfunction Eigenmode analysis Eigenstructure assignment Eigenvalue assignment lower bounds placement problems Eigenvalues Eigenvectors Electric field sensors fields machines power systems throttle control vehicles Electrical activity appliances behaviour breakdown characteristics conduction conductivity contacts feedback

impedance machines networks properties pulses shocks stimulation Electro-hydraulic systems Electrodes Electromagnetic devices field problems fields induction modes pulses . scattering problems signals transducers transients transmission waves Electronic applications control units (ECU) mail systems Electronically-controlled transmissions Electronics Element analysis Embedded systems Encoders Encoding End point control End users Energy control dependence distribution expenditure management systems spectra storage weighted acauisition Engine control dynamometer efficiency management modelling systems Enhancement Enterprise integration modelling Enthalpy relaxation Entropy Envelopes Environmental coefficients stability Environment architectures control Environmental engineering Environments EPROM Equalization Equilibrium Equipment Ergonomics Error analysis control -correcting codes correction criteria -detecting codes detection estimation -free probability rate performance rates transfer functions Estimation algorithms parameters theory Estimators Ethernet

Evaluation Events Excitation *control windings* Execution times Exhaust gas recirculation Expanded memory Expert systems Exponential lag Exponentially Exponentially stable Extended Kalman filters Extended networks Extrusion

F

Factorization methods Factory automation Failure detection isolation Farming Fast Fourier transforms Kalman algorithms parallel algorithms timing methods Fatigue Fault detection diagnosis distributions identification isolation location tolerance -tolerant software tolerant systems Feedback amplifiers capacity channel control methods elements lasers linearization loops signals stabilization systems variables Feedforward compensation control networks Fermentation processes Fibre amplifiers conduction velocity connectors counlers interferometers networks optic gyros networks sensing thermometry preamplifiers Field effect transistors Field effects Fieldbus Filter banks circuits design stability Filtering problems . techniques theory Final controlling drives value theorem values Finance

Financial systems Finite arc segments automata difference method solutions differences element analysis computation field simulation method solutions elements fields state machines First-order systems Fixed command control Flapper valves Flexible arms automation manufacturing systems Flicker Flight control Flip-flops Floating action control Floppy disks Flow control diagrams heterogeneity measurement Flowcharts Fluctuations Flux density space vectors Follow-up control Food processing Force balance control Forced oscillation Forecasts Formal languages methods specification verification Formats FORTRAN Forward channels control elements paths signals Four-wheel drive steering Fourier analysis optics transforms Fourth-generation languages Fractal systems Fractals Fractional harmonics Fractions Frame synchronization Frequencies Frequency changers control conversion -dependent characteristics dispersion dividers domains estimation measurements modulation -response characteristics methods responses signal analysis

spectrum stabilization standards tracking Friction Front end Fuel control iniection Full graphic displays wave analysis wave discontinuities waves Function approximation generators Functional blocks chains Fundamental constants matrices processes relations Fuzzification Fuzziness Fuzzy control data expert systems hybrid systems inference inputs logic modelling models outputs sensors sets -set theory subsets supervision systems

G

Gain characteristics crossover frequency cut-off frequency dynamics enhancement methods margins modulation regimes saturation suppression Game theory Gap electrical machines elements measurements transient torques Garbage Gas insulated substations switchgear turbines Gauss Markov sources Gaussian distributions functions noise processes General bilinear transformations nonperiodic waves simulators Generalized connection networks linear systems modus ponens predictive control quantizers sidelobe cancellers state space Generated Lyapunov functions Generation

lifetime Generator Generators, electric Genetic algorithms Geometric approaches codes distributions properties Geometrical theory Geometry Gimbal axes Gimbals Global optimization positioning systems . stability Gradient methods Gradients Gradiometers Graph theoretic models Graph theory Graphic displays printers Graphs Green/Es function Group work Guidance systems Gyromagnetic ratios Gvros Gyroscopes

Η

Hall effect elements Hand-printed characters Handling Hardware Harmonic analysis balance analysis techniques drives functions generation response characteristics responses Harmonics Hashing Headers Heart wall motions Heat exchangers flows Helicopter control dynamics Heuristic programming searches Heuristics Hierarchical control decision making structures systems Hierarchically intelligent control Hierarchies High current density -density -efficiency -frequency diffraction noise performance -gain feedback -temperature stability superconductors Higher-order statistics Hilbert spaces transformers

Hill climbing H-infinity control optimization Histograms Holding actions elements voltages Holography Huffman codes Human brain -centered design error factors -machine interface perception reliability supervisory control Hurwitz criterion polynomial HVDC transmission lines Hybrid computers modes vehicles Hydraulic accumulators actuators amplifiers motors relays turbines Hydroelectric systems Hydrogenerators Hydrothermal power systems Hyperstability Hypertension Hypotheses Hysteresis error loops losses motors

I

Ideal values Identifiability Identification algorithms Identifiers Idle speed control IF-THEN operators Image amplification analysis coding compression converters distortion enhancemen flows , intensifiers interpolation matching modelling motion compensation processing recognition reconstruction registration restoration segmentation sensors smoothing Imaginary axis Impact Impedance control Implementation Implication operators Implicit systems Impulse conditions functions responses signals

Impulses Incomplete data Index method profiles Indexes Indicated angles Indices Indicial responses Indirectly controlled systems variables Induced efficiency enhancement instability Inductances Induction generators machines motor design motors Inductive pickoff Inductors Industrial control production systems robots Industry automation Inertia matrices Inertial measurement units navigation platform reference units sensors Inference engines processes Infinity control Information analysis capacity depth flows integration retrieval systems technology theory Infrared detectors Inherent feedback stability Inheritance Initial characterization states Injection moulding Inner loops matrices Innovation Input admittance centralised systems decentralised systems elements eauipment estimation impedance matrices signals Inputs Insensitive Insensitivity Instability Insulation Insulators Insulin sensitivity Integer programming Integral action factors rates times actions control controllers cross sections equation formulations equations

formulation performance indices representations Integrals Integrated circuit antennas yields circuits injection logic optics plant control vehicle highway systems (IVHS) Integrating amplifiers elements gyros Integration Integrators Intelligence Intelligent control cruise control instrumentation knowledge-based systems machines manufacturing systems Intensity changes modulation method noise Interacting queues service stations Interaction mechanisms Interactive approaches programs vehicle control vehicle dynamics Interactor matrices Interchangeable terminals Interconnected systems Interconnection matrices networks technology Interdigital transducers Interdisciplinary design Interface state generation states Interfaces Interference Interleaved memory Interlocking Intermittent signals Internal combustion engines topology International stability surveys Interplanetary spacecraft Interpolation algorithms approximation Interpretation trees Interpreters Intervals Intrinsic bistability modes Invariance Invariant systems Invariants Inventory control Inverse dynamic problem dynamics control kinematic problem Monte Carlo Nyquist array scattering problem system transfer function locus transform

Inversion Inverter drives Inverters ISDN ISO Isolated networks Iterative improvement methods

J

Jacobian matrices JIT manufacturing Jitter Joint probability trajectories Jordan canonical form normal form Jump process Junctions

K

Kalman filters Kharitonov theorem Kinematics Kinetic control system Knowledge acquisition -based control -based control -based systems engineering representation tools transfer

L

Labels Laboratory education techniques Ladder algorithms filters Lag elements networks Laplace transforms Large AC motors cassegrain antennas deviations -scale systems signals space structures Largest singular value Lattice filters Lattices Lead networks Leads Leakage current reduction currents properties Lean manufacturing Learning algorithms control systems Least squares Least-squares approximation algorithm estimation identification method problems Level control Levels Life cycles Lifetime Light

function Limit cycles theorems Limited codes data Limiters Limiting control actions distributions Limits Linear analvsis block codes codes control systems dependence differential transformers equations estimation filters independence integrated optics motors multivariable systems networks optimal control regulators output feedback phase prediction programming quadratic regulators systems theory Linearizable systems Linearization Linguistic support synthesis variables Living systems LMS algorithm Load dispatching flows flow solutions forecasting frequency control modelling regulation Local area networks computer systems control controllability structures Locus Logarithmic time dependence Logging Logic analysers applications arravs circuits controllers design diagrams gates minimization units Logical control operation products sums Long-term memory Loop gain phase angles transfer Loops Loss minimization Losses Low drive power energy frequencies

Likelihood

-frequency dispersion -frequency intensity -frequency noise frequency scattering -level languages noise -noise channels -noise optimization pressure threshold -threshold current Lowpass filters LQG control method LQR control method LSI chips Lubricants Lumped constant models Lumped-parameter systems Lyapunov equation function methods stability

Μ

Machine code languages learning -oriented languages recognition Machinery Machines Machining Macro Magnetic amplifiers bearings brakes clutches dipole excitation field computation fields fluid clutches modulators powder clutches properties recording channels resonance microscopy responses superlattices suspension Magnetically insulated gaps Magnetization reversal Magnetized ferrite Magnitude contour Main memory database systems (MMDBS) Maintenance engineering Man/machine interaction interfaces systems Management systems Manipulated variables Manipulation tasks Manipulator inertia matrices Manipulators Manoeuvrability Manoeuvring target Manual control operations Manufacturing processes systems Many-degrees-of-freedom systems Marginal distribution stability Marine systems

Markov decision problems decision processes models parameters Mass spectrometry Master-slave systems Matched filters Material balance control systems Mathematical models programming systems theory Matrix algebra determinants elements equations formulation inversion methods polynomial equations printers Riccati equations triangularization Maximum entropy likelihood estimators principle Maxwell equations MC machine tools Mean -square error time between failures (MTBF) to failure (MTTF) to repair (MTTR) value analysis Measured feedback values Measurement noise Measuring elements points range span transducers transmitters units Mechanical engineering manipulators properties stress svstems Mechanisms Mechanization Medical systems Median filters frequency Medical applications Membership degrees functions Memory applications hanks cell interference iunction cells units Memoryless sources Mental workload Meta-level knowledge Metadyne generators Metals Method of weighted residuals Methodology Metrics Microcomputer -based control -based systems systems Microcomputers

Microprocessor control Microprocessors Microprogramming Microscopes Microstrips Microsystems MIMO Minimax techniques Minimization Minimum distance -phase systems principle redundancy -time control variance control Minor loops Missiles Mixed sensitivity problem Mobile robots Modal control couplers transformation Mode analysis structure theory Model approximation -based control -based recognition -following control management reduction reference adaptive control control Modelling errors Models Modems Modes Modulation Moment method Moments of inertia Monitored control systems Monitoring elements feedback loops Monitors Monopolar Monostable multivibrators trigger elements Monotone systems Monotonicity Monte Carlo calculation method simulation Motion estimation *parameters* Motor control elements patterns units Motors Mouse Movement Moving average models objects Multi-access systems Multi-action controllers Multi-input/multi-output systems Multicache Multichannel controllers Multichip Multicomputer systems Multiconductor systems transmission lines Multidimensional digital filters

systems Multilevel codes control controllers structures svstems Multiloop control Multimachine Multimedia Multiobjective optimisations Multiple-criterion optimisation Multiplicative noise Multipliers Multiport networks Multiposition controllers Multiprocessing systems Multiprocess or systems Multiprocessors Multiprogramming Multirate Multisensor integration Multispeed controllers floating action Multistep avalanche chamber controllers Multitarget tracking Multivalued mapping Multivariable control systems feedback control systems polynomials systems Multivariate quality control Multiversion software Multivibrator

N

NAND elements operations Nash games Natural frequencies languages line widths Navigation systems Negative feedback transconductance Network analysers observability reliabilitv topologies Networks Neural activity control dynamics -network models nets networks Neutral steer zone control zones Nichols charts diagrams Noise analysis characteristics characterization control levels power spectrum Noisy channels images speech

Non-Gaussian processes Non-interacting control Nonlinear analysis circuits control systems distortion equations external cavity filters gain interfaces mirrors models optical interactions Poisson equation potentiometers programming refraction refractive indices svstems theory Nonlinearity Non-minimum phase systems Non-orthogonal problems Non-parametric identification regression Non-polar liquids Non-sinusoidal waves Non-stabilizable systems Non-stationary learning characteristics signals systems Non-symmetric linear svstems NOR elements operations Normal distribution Norms NOT elements Notch filters Nozzles Nuclear plants power stations reactors Number systems Numeric control Numerical algorithms analysis methods simulation solutions Nvauist diagrams filters Nyquist's criterion

0

Object modelling techniques -oriented programming recognition Objects Observability indices Observable Observers Obstacle avoidance detection Obstacles Off-line programming Office automation Offset voltages Ohmic contacts Ohms On-line closed loops control

security analysis On-off actions control controllers Open -loop control systems transfer functions loops structure mixers Opening switches Operability Operating systems Operational . amplifiers calculus characteristics Operations research Operators Optical amplifiers band gap birefringence bistability character recognition communication constants data storage directional couplers disks feedback fibre networks fibres fields flows implementation modulation modulators nonlinearities parametric oscillators polarization bistability properties pulses receivers response solutions spectroscopy stochastic control storage devices switches transducers transmission wave breaking Optimal control estimation experiment design filtering load flow power flow priority assignment regulators rejection search techniques svstems trajectory Optimality Optimization devices problems Optimum Order reduction Organizational factors OR operations Oscillation Oscillators Outages Outer gimbals loop Output axis brushes error identification feedback injection matrices regulation signals variables winding

Overall stability Overdamping Overlow Overlap Overlap Overlap Overlapping Overload Overshoot Oversteer Overtones Overvoltages Overvite spectra

P

Package design Packages Packets Page printers Paper industry Parallel algorithms computation computers memories networks processing processors programs transductors Parallelism Parameter estimation identification ontimization Parameters Parametric excitation resonances variation Parametrization Parsers Partial differential equations expansions response channels Particle size measurement Particulate processing Passive compensation elements filters ranging suspension Passwords Path planning Pattern generation identification recognition Pay-off functions P controllers PD controllers Performance analysis characteristics drives evaluation functions indices limits monitoring Periodic motion replacement structures waves Permalloy films Permanent magnet motors undulators Permanent magnets Permeability Permittivity Permutation algorithms Perturbation analysis theory

Perturbed coefficients Personnel qualifications Petri-nets Pharmacokinetic data Phase advance controllers network angles calibration centres characteristics conjugation contours correction crossover frequency difference distortion epitaxy frame analysis inverters lag lead -locked arrays -locked loop locking locus margins modulation noise -only modulation perturbation technique plane response shift shifters space stability system identification systems transition Phased array pH control Photodiodes Photomultipliers Photons Physical models Physics Physiological models Physiology Pick off PI controllers Picture elements processing PID control controllers Piecewise linear analvsis controllers Pipelined architectures VLSI Pipelines Pipelining processing Piston valves Pistons Pitch Pitchfork bifurcation Pixels Plane wave exposure Plane waves Planning Plants Plantwide Plastics industry Pneumatic relays systems Point-to-point control Pointing systems Poisson arrivals processes Polar plots Polarity Polarization analysis dependence Pole assignment zero assignment Poles

Polygons Polymerization Polynomial methods models transforms Polynomials Polyphase networks Popov criterion Port fuel injection Posed problems Position accuracy control errors estimation feedback location -sensitive photomultipliers velocity Positioning systems Positive columns displacement pumps feedback Possibility theory Postmortems Potentials Potentiometer pick off Potentiometers Power amplifiers assisted control control circuits density spectrum deposition characterization devices dissipation distribution distribution circuits dividers flow generation law descriptions losses management spectra spectral density station control supplies supply voltages -system control stabilizers voltages systems transformers transmission winding Preamplifiers Precision measurements Prediction error methods intervals methods problems Predictive control Predictor theory Pre-excitation Preprocessing Preprocessors Preset Pressure controlmeasurements -sensitive probes transducers volume relationships wire chambers Pressurized water reactors Prevention Preventive maintenance Primal sketches Primary regulation sites Principle of superposition Printed

antennas circuit antennas circuits dipoles Printers Printing industry Prior history Priority Probabilistic data association load flows logic models risk assessment simulation Probabilities integration Probability density function distribution function Probes Problem solvers Problem-oriented languages Procedure-oriented languages Process automation computers control -control languages equipment identification models parameter estimation simulators Processes Processing techniques Processor arravs systems Processors Product strategy Product quality Production control costs svstems Productivity Products industry Profiles Program assemblers controllers controlling elements costs diagnostics documentation stores Programmable controllers logic controllers read only memory (PROM) Programmed control Programming approaches environments languages support systems theory Programs Project management selection Projects Propagation Proportional action factor actions bands control factors controllers counters gain plus derivative action controllers plus integral action controllers plus derivative action plus derivative controllers

Propulsion control Protection Protocols Prototyping Pseudo random sequences Pulp industry Pulse generation position modulation radiation response sequences shape synthesis signals (train) functions trains width -width modulation Pulses

Q

Quadratic control optimal regulators performance indices programming stability stabilizability Quadrature axis brushes detection mirror filters Qualitative analysis control simulation Quality control of work life Ouantity Quantization errors noise Quantized signals states Quantizer design Ouantizers Quaternion feedback Queues Queuing network models theory

R Radial

base function networks pumps Rail traffic Railways RAM Ramp function response functions input Random access memory (RAM) drift fields functions inspection media noise number generators numbers perturbations processes searches telegraph noise variables walk Range data finders images of disturbance

of set value splitting Ranges Ranks Rapid programming Rate actions constants feedback Rational matrices Ratios Re-energization Reachability Reachable states Reactive power Reactor control modeling Readouts Real axis time -time ΑI communication computers computer systems expert systems languages operating systems systems tasks Realisation theory Reasoning Receivers Reception Receptors Recognition Recording channels codes heads media noise performances properties technology Recordings Recovery circuits times Recruitment modulation Rectangles Rectangular wave transforms waveguides waves Rectifiers Recursive algorithms approaches control algorithms digital filters estimation filters *least squares* Reduced-order models Reduction Redundancy control reduction Redundant manipulators Reference adaptive control architecture elements input elements signals variables signals variables windings Regeneration Regenerative feedback Regions Register allocation Registers Registration Regression

algorithm systems analysis estimates relationships Regularization Regulating elements energy units Regulation Regulator control theory Regulators Rejection Relational databases Relative stability Relativistic Relaxation analysis oscillation frequency Relay control Relavs Reliability analysis evaluation test systems theory Reliable Relief valves Remote control Renewable energy systems Renewal processes Reproducibility Reproducible Requirements analysis Reserves Reset actions times Residue feedback number systems Residues Resistance Resistivity Resistors Resolution Resolved gain measurements reflectance Resolvent matrices Resonance Resonant frequencies Resource allocation Response curves functions measurement times Responses Restricted instruction sets Return difference ratio differences signals Reversibility Reversible systems Revolutions Riccati equations Ride comfort Rise time Risk RNA Road traffic Robot arms calibration control dynamics kinematics navigation programming vision Robotic manipulators Robotics Robots Robust control estimation

estimators performance stability stabilizability transmission Robustness Root locus diagrams Root mean square value Roots Rotating disks Rotation Rotor generators Rotors Round-off noises Routh=s criterion Routing algorithms Rule-based systems Rules Run-timesystems Runge-Kutta method

S

Safety analysis -critical Sample and hold sizes Sampled data -data control -data systems signals Samplers Samples Sampling action control controllers elements freauencv intervals periods rates systems Satellite controlapplications Satellites artificial Saturation control power Scalar Scales Scattered data Scatterers Scattering parameters problems Scene analysis segmentation Scheduling algorithms Search engines methods Searches Searching systems Second-order systems Self -adapting algorithms -adaptive control -adjusting systems -aligned structures -excitation winding -excited oscillation -operated control -optimizing control -optimizing systems -organizing storage -organizing systems oscillation phase -phase modulation -regulation -reproducing automata -tuning control

Semantic networks Semi -active dampers suspension -empirical models -Markov processes Sensitive Sensitivity analysis functions Sensor failures fusion svstems Sensors Sequence estimation Sequences Sequential control algorithms machines switching Series compensation resistance transductors Servo hydraulics svstems Servomechanisms Servomotor actuators Servomotors Set -point control points -reset operations values Sets Settling times Shape description discrimination Shaped reflectors Shapes Shaping filters networks Shift registers Ship control Shop-floor oriented systems Short-term memory Shunt capacitors compensation Sign detection Signal analysis cancellation converters correlation delay detection duration flow diagram levels lines processing -processing algorithms processors reconstruction selectors space codes svnthesis -to-noise ratio Signals Signature analysis registers Simulation languages Simulators Simultaneous stabilization Sine -cosine potentiometer waves Single -input/single-output systems mode -mode operation

-tuning regulators

Singular control perturbation method perturbations points systems value decomposition Singularities Sinusoidal oscillators signals Sinusoids SISO Skill -based production -based systems Slave stations Slaves Sliding curves mode -mode control surfaces Slopes Slot assignment algorithms lines Slots Small signal modes Smart power applications Smoothing filters Smoothness criterion Social and behavioural sciences impact of automation requirements Socio-technical system design Soft sensing Software engineering metrics performance productivity project management reliability safety specification tools Solar cells energy Solid state cells lasers Solids processing Space robotics vehicle optical-controlsstructure interaction (O-CSI) vehicles Spacecraft autonomy Spark advance control Special-purpose computers Spectra Spectral analysis characteristics correlation density function estimation factorization transformations Spectroscopy Spectrum analysers analysis estimation filters Speech analysis control Speed control measurement Splines Split field motors

series motors Springs SQL Square waves Squaring circuits Stability analvsis criteria domains limits of numerical methods properties robustness tests Stabilizability Stabilization methods Stabilizers Stabilizing controllers feedback feedforward networks Stable states Stackelberg games Standalone Standard Standards Star networks State assignment estimation feedback matrices monitoring observers scintillation detectors sequence estimation space -space formulas -space methods -space models -space realization trajectories variables vectors Statecharts Statements States Static accuracy controllers decoupling electrification friction induction transistors models RAM Stationarity Statistical analysis design inference process control Statistics Stator windings Status reports Steady-state availability deviation errors stability values Steady states Steam generators plants turbines Steel industry manufacture Steepest descent Step discontinuity function responses functions inputs motors Stepless actions Stepping actions

controllers motors relays switches Steps Stereo vision Stochastic approximation automaton complexity control jump processes modelling parameters Petri-nets programming properties realization relaxation systems theory variables Stop band filters Strapdown systems Stray capacitance fields losses magnetic fields Stress Structural constraints optimization parameters properties relaxation stahility Structure systems Structured analysis programming singular value Suboptimal control svstems Subspace methods Substitution Subsynchronous oscillations resonance Subsystems Successive approximations technique Summing amplifiers elements points Supercomputers Supervision Supervisory control Susceptibility Switched capacitor filters capacitors reluctance motors Switches Switching algebra algorithms characteristics functions networks rectifiers surfaces theorv . times values variables Symbols Synchro angles control receivers control transformers control transmitters indicators resolvers torque receivers torque transmitters transmitters Synchronization Synchronous

data flow machines motorsSystem analysis architectures diagnosis documentation failure and recovery failures identification integration integrity matrices models noise order reduction reliability security sensitivity state estimation svnthesis theorv transfer functions Systems concepts design engineering methodology

Т

Tachometers Target control tracking tracking filters Targets Tasks Teaching Technological forecasting Technology transfer Telecommunication Telecontrol Telemanipulation Telematics Telemetry Teleoperation Telephone networks Telephones Telerobotics Telescope detectors Telescopes Television systems Temperature calculations coefficients control distributions measurement profiles Temporal logic reasoning Terminal control reliability voltages Terminals Termination Terms Ternary logic Test data adequacy generation length Testability Tests Thermal conductivity superconductors degradation diffusivity equilibrium nitridation noise properties stability

Thermistors Three-term action control controllers Threshold currents decomposition functions logic of resolution selection value voltage Thresholds Throughput Time constants delay -delay estimation spread -domain analysis calculations correlations method reflectometers responses spectroscopy domains -frequency localization representation -invariant plants systems lag -optimal control Petri-nets response reversal schedule control controllers -series analysis -shared control -sharing programs -sharing systems signals -slot assignment synchronisation systems -varying plants -varving systems Timed Petri-nets Timing analysis jitter recoverv simulators Tissues Token-ring protocol Tolerance Tolerant Top-down methods Torque amplifiers control motors synchro Torsional vibration dampers Tracking applications characteristics systems Traction assistance controlspinout control yaw control Trade offs Traffic control Train control Training Trajectories Trajectory planning Transactions Transceivers Transcoders Transconductance Transconductors Transducers

Transductor elements Transfer contacts elements function matrices functions Transformation matrices Transformations Transformer oil Transformers Transforms Transient analysis deviation electrical discharges energy transfers errors gratings oscillations radiation responses scattering signals stability analysis assessment states system deviation torque Transistors Transition matrices modes noise systems time Transmission characteristics electron microscopy line matrices line resonators lines systems zeroes Transmitters Transponders Transport delay properties Transportation control Transversal filters Travelling salesman problem wave amplifiers modulators waves Tree attenuation searches structures Trees Trends Triangular resonators Tribochemical wear Trigger elements Triodes Triplers Truth tables Tuneable filters Tuned power amplifiers Tuning characteristics Tunnel junction receivers junctions Turbines Turbulence Turbulent convection Turing machine Turnkey systems Two -dimensional systems -phase induction motors -speed controllers -term action control controllers Tyres

U

Ultrasonic transducers Uncertain dynamic systems linear systems polynomials Uncertainty Uncontrollable Undamped frequency Underdamping Understeer Uniform electric fields Uniformity Unipolar charge injection converters injection Unique action Uniqueness Unit action potentials commitment problem impulse step function response Units Universal control data compression Universe Unmonitored control systems Unobservable Unreliable machines Unstable Upper atmosphere Urban systems User interfaces Utility functions

V

Validation Validity Valves Vane pumps Variability Variable -delivery pumps -length codes -structure control structures -structure systems valve timing control Variables Variance matrices Variational analysis Vector auantization quantizers Vectors Vehicle aerodynamics dynamics simulators suspension Vehicles Velocity control errors feedback measurements overshoot saturation Verification Vibration dampers measurement View angles Views Virtual reality Viscous damping friction Visibility

Visual motion pattern recognition Voltage amplifiers characteristics collapse control distribution inverter switches stability stabilizers standards Volterra series Voltmeters Volts

W

Waiting times Walking Walsh function Ward Leonard drive Warehouse automation Waste treatment Water pollution Wattmeter Wave equations guides Waves Weibull distribution Weighted moving average Weighting functions Wheels White noise Wide area networks Width Wiener filters Wind speeds Windmills Windup Work organization

Y Yaw rate Yourdon

Z

Zero crossings drift error frequency -order hold sets transfer function transformation