

MA202

NUMERICAL METHODS

Solution of linear system - Gaussian elimination and Gauss-Jordan methods - LU - decomposition methods - Crout's method - Doolittle method - Cholesky's method - Jacobi and Gauss-Seidel iterative methods - sufficient conditions for convergence - Power method to find the dominant eigenvalue and eigenvector.

Solution of nonlinear equation - Bisection method - Secant method - Regula falsi method - Newton- Raphson method - Order of convergence of these methods - Horner's method - Graeffe's method - Birge-Vieta method - Bairstow's method.

Curve fitting - Method of least squares and group averages – Least - square approximation of functions - solution of linear difference equations with constant coefficients.

Numerical Solution of Ordinary Differential Equations- Euler's method - Euler's modified method - Taylor's method and Runge-Kutta method for simultaneous equations and 2nd order equations - Multistep methods - Milne's and Adams' methods.

Numerical solution of Laplace equation and Poisson equation by Liebmann's method - solution of one dimensional heat flow equation - Bender - Schmidt recurrence relation - Crank - Nicolson method - Solution of one dimensional wave equation.

REFERENCES:

1. Kandasamy, P., Thilagavathy, K., and Gunavathy, S., 'Numerical Methods', Chand and Co., 2007.
2. Jain, M.K., Iyengar, S.R., and Jain, R.K., 'Numerical Methods for Scientific and Engineering Computation', Wiley Eastern, 1992.
3. Gerald, C.F., and Wheatley, P.O., 'Applied Numerical Analysis', M/s. Addison Wesley, 1994.

EE202

AC MACHINES

Alternators - construction, principle and types - armature reaction - load characteristics - predetermination of regulation - two reaction theory – parallel operation

Synchronous motors - construction, principle and types - starting methods - phasor diagrams - V and inverted V curves - Hunting

Poly phase Induction motors- construction, principle and types - equivalent circuit - circle diagram - starting and speed control - induction generators

Single phase induction motors - construction, principle and types - double revolving field theory - equivalent circuit

Permanent magnet brushless motors - construction, principle and types - phasor diagram, Torque Equation.

REFERENCES:

1. Nagrath I.J. & Kothari, D.P., 'Electrical machines', Tata McGraw hill, New Delhi, 3rd edition, 2004.
2. Say M.G., „The performance and design of alternating current machines “ CBS Publishers and Distributors, New Delhi, 1984.
3. Irving L. Kosow „Electric Machinery and Transformers“ PHI, New Delhi, 1999.
4. Cotton, H., „Electrical Technology“, CBS Publishers, New Delhi, 6th edition 1984.
5. Miller, T.J.E., „Brushless Permanent Magnet And Reluctance Motor Drives“, Clarendon Press- Oxford , 1989.

EE204

EE204 TRANSMISSION AND DISTRIBUTION OF ELECTRICAL ENERGY

Transmission line parameters – resistance, inductance and capacitance calculations - single phase and three phase lines – double circuit line - effect of earth on transmission line capacitance

Performance of transmission lines – regulation and efficiency – tuned power lines power flow through a transmission line – power circle diagrams, formation of corona – critical voltages – effect on line performance

Mechanical design of overhead lines – line supports – insulators - voltage distribution in suspension insulators – string efficiency - testing of insulators stress and sag calculation – effects of wind and ice loading

Underground cables – comparison with overhead line – types of cables – insulation resistance – potential gradient – capacitance of single core and three core cables

Distribution systems – general aspects – Kelvin's Law, A.C. distribution – single phase and three phase - techniques of voltage control and power factor improvement, recent trends in transmission and distribution systems

References :

1. Wadhawa, C.L. „Electrical Power Systems“, New Age International Publishers, 6th edition, 2009
2. D. P. Kothari and IJ Nagrath, „Power System Engineering“ Tata Mcgraw – Hill, 2nd edition, 2008
3. Gupta B.R., ' Power system Analysis & Design', S. Chand and Company Ltd.,2nd edition, 2008

EE206

NETWORKS AND LINEAR SYSTEMS

Frequency response - Harmonic analysis of simple circuits - Fourier series - Fourier integral - Fourier transforms methods

Classification of signals - representation in terms of elementary signals - impulse functions - Time response of circuits - complex frequency - poles and zeros - frequency response from pole-zero configuration – Driving point impedances - two-port networks

Realizability of one port networks – Hurwitz polynomials – Position function – necessary and sufficient condition of positive real functions – testing a positive real function – properties of driving point impedance – synthesis of LC, RL and RC driving point admittance

Differential equations of translational and rotational systems - transfer function - block diagram representation - Block diagram algebra - signal flow graph - Mason's gain formula

Concepts of state and state variables – state space modelling for simple electrical and mechanical systems – state transition matrix - solution of state equations

REFERENCES:

1. D.Roy choudhury, "Networks and Systems", New Age International Publisher New Delhi, 2005.
2. *Nagrath I.J. and Gopal M, ' Control Systems Engineering', New Age International, 5th edition, 2007.*
3. *F.F.Kuo, „Network Analysis and Synthesis“, John Wiley Inc., New York , 1966.*
4. *Cheng.D.K., ` Analysis of Linear Systems', Addison Wesley, 1988.*
5. *James W. Nilsson and Susan Riedel, "Electric circuits", Prentice Hall; 8 edition, 2007.*

EE208

EE208 ANALOG ELECTRONIC CIRCUITS

Small signal amplifiers - biasing circuits of BJT and FET transistors, analysis and design of BJT and FET amplifiers, chopper stabilized amplifiers

Large signal amplifiers - analysis and design of class A and class B power amplifiers, class C and class D amplifiers, thermal considerations, tuned amplifiers

Feedback amplifiers – gain with feedback - effect of feedback on gain stability, distortion, bandwidth, input and output impedances ; topologies of feedback amplifiers

Oscillators – Barkhausen criterion for oscillation - Hartley & Colpitts oscillators - phase shift, Wien bridge and crystal oscillators - clapp oscillator - oscillator amplitude stabilization

Pulse circuits – attenuators - RC integrator and differentiator circuits - diode clampers and clippers – multivibrators - Schmitt Trigger- UJT Oscillator

1. Jacob Millman , „ Micro electronics“ McGraw Hill, 2006.
2. Allen Mottershead, „Electronic Devices and Circuits-An Introduction“, PHI, 18th Reprint, 2006.
3. Robert.L.Boylestad, „Electronic Devices and Circuit Theory “ 9th Edition, Pearson 2005.
4. Sedra Smith, „Microelectronic Circuits“, 6th Edition, Oxford university Press, 2009.

EE210

DIGITAL ELECTRONICS

- Review of number systems, binary codes, error detection and correction codes. Digital Logic Families - Introduction to RTL, DTL, TTL, ECL and MOSL families - wired and operation, characteristics of digital logic family - comparison of different logic families
- Combinational logic - representation of logic functions-SOP and POS forms K-map representations-minimization using K maps - simplification and implementation of combinational logic - multiplexers and demultiplexers - code converters, adders, subtractors.
- Sequential logic- SR, JK, D and T flip flops - level triggering and edge triggering - counters - asynchronous and synchronous type - Modulo counters - Shift registers - Ring counters.
- Synchronous Sequential Logic circuits-state table and excitation tables-state diagrams-Moore and Melay models-design of counters-analysis of synchronous sequential logic circuits-state reduction and state assignment.
- Asynchronous sequential logic circuits-Transition table,flow table-race conditions-circuits with latches,analysis of asynchronous sequential logic circuits-introduction o design –implication table-hazards-programmable logic array and devices

References

1. Morris Mano,M .'Digital Logic And Computer Design', Prentice Hall Of India, 2005.
2. Donald D. Givone, "Digital Principles And Design", Tata McGraw Hill, 2002.
3. Tocci R.J.,Neal S. Widmer, 'Digital Systems: Principles And Applications', Pearson Education Asia, Second Indian Reprint 2002
4. Donald P Leach ,Albert Paul Malvino,Goutam Sha,"Digital Principles And Applications"The McGraw –Hill ,Sixth Edition,2007

EE212

SYNCHRONOUS AND INDUCTION MACHINES LABORATORY

- 1. Load test on three phase induction motor.**
- 2. No load and blocked rotor test on three phase induction motor.**
- 3. Load test on grid connected induction generator.**
- 4. Load test on self –excited induction generator.**
- 5. Load test on single phase induction motor.**
- 6. Regulation of three phase alternator by E.M.F. and M.M.F. methods.**
- 7. Load test on three phase alternator.**
- 8. Synchronisation of three phase alternator with infinite bus bar.**
- 9. V and inverted V-curves of synchronous motor.**
- 10. Study of induction motor starters.**

EE214

EE214 ELECTRONIC CIRCUITS LABORATORY

- 1. Common emitter amplifier**
- 2. Common collector amplifier**
- 3. RC oscillators**
- 4. Monostable multivibrator**
- 5. Astable multivibrator**
- 6. UJT oscillator**
- 7. FET Amplifier**
- 8. Feedback Amplifier**

