

DC– 21 DETECTION AND ESTIMATION THEORY

1. Stochastic signal, orthogonal representation of signals, random process, Markov process, correlation function, power spectral density. Tehebycheffi inequality.
2. Detection in presences of noise, correlator, optimum filter, matched filter.
3. Weighted probabilities and hypothesis testing, composite hypothesis, likelihood ratio detection, sequential detection.
4. Principles of estimation, properties of estimator, Cramer- Rao Bound, Baye's maximum likelihood and least square estimation, parameter estimation, estimation of continuous waveforms, time invariant linear estimation.
5. Current Trends
Compensation of Adaptive arrays current trends in adaptive array

SUGGESTED TEXT BOOKS AND REFERENCES:

1. Principles of digital Communication: J.Das, S.K. Mullick, P.K. Chatterjee, New age International (P) Ltd publisher, New Delhi
2. Modern digital and Analog communication Systems, B.P. Lathi, Oxford publishers.

DC-22 OPTICAL COMMUNICATION

1. Introduction to optical communication, Principles of transmission Optical Fiber modes and Configuration Mode, Theory for Circular Waveguides, Single Mode Fiber, Multi Mode Fiber, Numerical Aperture, Mode Field Diameter, V number Fiber Fabrication technique.
2. Optical sensors, LED's, Laser. Diodes, Modal reflection noise, Power launching & Coupling, Population Inversion, Fiber splicing, Optical connector, photo detector, PIN, avalanche detector response time, Avalanche Multiplication noise.
3. Signal degradation in optical fibers, Attenuation losses, signal distortion in optical waveguide dispersion, chromatic dispersion, Intermodal distortion, pulse broadening in Graded index fibers, Mode Coupling, Advanced Fiber Design, Dispersion shifted , Dispersion Compensating Fiber, Design Optimization of single mode Fibers.

4. Coherent Optical fiber communication, Modulation Techniques, Misalignment, Fiber to fiber joints optical fiber link design, Rise time budget and link power budget , long-Haul systems, Bit error rate, Line coding, NRZ, RZ, Block codes, Error correction
5. WDM concepts and components operation, Fiber granting, hologram, Tunable Filters, Directional coupler, Dispersion management, Optical amplifiers: EDFA, Photonic switching , Optical Networks: SONET/SDH, optical interference, ring topology, star topology.

Suggested Text books and References:

1. G.Keiser, "Optical Fiber Communication(3rd edition) "Mc graw hill,2000
2. D.F. Mynbacy and L. Scheiner,"Fiber optic communication technology"
3. Ghatak and K. Thyangrajan,"Introduction to fiber optic", Cambridge University press,1988

DCE–26 ADVANCED ANTENNAS AND PROPAGATION

Radiation from cylindrical antennas

Electromagnetic fields and theory of radiation- Geometrical optics- GTD and it application- Thin linear antennas- patterns of cylindrical antennas Integral Equation and moment method and their application to wire antenna.

Aperture antennas

Slot antennas- Babinet's principles- Rectangular horn- conical horn- ridge horn- spectrum horn corrugated horn- micro strip patch antenna- Feed methods of microstrip antenna- parabolic reflector antenna- cassegrain feed- lens antenna- fermat's principle- metal plate lens- artificial dielectric lens antenna.

Antenna Arrays

Pattern multiplication- Linear arrays with optimum dolph- Tchebyscheff distribution- Phased array antenna application- yagi-uda array- Microstrip arrays- log periodic dipole array.

Antenna Synthesis and Measurements

Continuous sources- Schelkunoff polynomial method- Fourier transforms method- Wood ward method pattern- phase- directivity- gain polarization- impedance measurements.

Propagation

Radio wave propagation- ground wave- surface wave- Ionospheric propagation- Faraday rotation microwave and millimeter wave propagation- Attenuation due to rain, fog and atmospheric gases- Troposcatter propagation- duct propagation- Rain effects on antenna noise temperature.

TEXT BOOKS:

J.D.Kraus, Antennas, McGraw Hill, 1989.

Edward A.Wolff, Antenna Analysis, Arctect House, 1988.

REFERENCE BOOKS:

Johnson and Jasik, Antenna Engineering Handbook, McGraw Hill, 1984.

Balanis, Antenna Theory and Design, John Wiley, 1982.

Lucien Boithias, Radio Wave Propagation, North Oxford, 1987.

DCE-30 NEURAL NETWORK

Theory of representation; Two computational paradigms; Multi-layer networks; Auto-associative and hetro-associative nets; Learning in nets; Supervised and unsupervised learning; Applications of Artificial Neural Networks; Neural network simulators

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Text Book:

1. Haykin S., "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.