

EE 711: CONTROL OF ADVANCED ELECTRIC DRIVES (3-0-0: 3)

Concept of Matrix converter and Multi-level Inverter

Generalized Concept of Matrix converter, generalized theory of Rectifier, Chopper, Inverter and Cyclo-converter using Matrix converter, Generalized Concept of Multi-Level Inverter (MLI)

Control of Induction Motor Drives

Pulse Width Modulated (PWM) inverter fed Induction motor drives, Control of induction motor drives by Slip power recovery schemes, Vector control of Induction Motor: Principles of vector control, Direct vector control, derivation of indirect vector control, implementation – block diagram; estimation of flux, flux weakening operation.

Control of Synchronous Motor drives

Control strategies: Constant torque angle control, Power factor control, Constant flux control, Flux weakening operation, Load commutated inverter fed synchronous motor drive, Motoring and regeneration, Phasor diagrams.

Control of PM Motor Drives

Control strategies, modeling, vector control, flux-weakening operation, design of controllers, sensor-less control & rotor position estimation.

Control of DC Motor Drives

Closed loop control of chopper fed DC motor Drives, Speed controlled drive system, current control loop, modeling & design of current controller, closed loop control of phase controlled drives, open loop & closed loop transfer function of the drive, phase Locked loop control.

Digital controller for variable speed drives

Introduction to Digital controller for variable speed drives, Digital signal processor (DSP) & Field programmable Gate Array (FPGA) based variable speed drives, Applications of DSP & FPGA in sensor-less drives.

References:

1. B. K. Bose, "Modern Power Electronics and AC Drives", Pearson Publications.
2. R. Krishanan, "Electric Motor Drives", Prentice Hall, Indian Edition.
3. W. Shepherd, L.N Hulley, D.T.W Liang, "Power Electronics and Motor Control", II Edition, Cambridge University Press.
4. M. H. Rashid, "Power Electronic Circuits, Devices and Applications", PHI.
5. G.K Dubey, "Fundamentals of Electrical Drives", Narosa Publishers.
6. W.P Robbins, T. M Undeland ,N. Mohan, "Power Electronics", John Willey & Son's.
7. Phillip T. Krein, "Principle of Power electronics" Oxford University Press