

EE - PERMANENT MAGNET BRUSHLESS DC MOTOR DRIVES AND CONTROLS

Permanent Magnet machine configurations - Classification of Permanent Magnet Synchronous Machines (PMSM) - Fundamentals of PMSM - Mathematical model, characteristics analysis and simulation of Brushless DC (BLDC) Motor.

Power converters for BLDC motors - Speed control of BLDC motor drives - Advanced speed control of BLDC motor drives - Influence of machine parameters on dynamic response and speed range - Practical issues on implementation.

Analysis and reduction of torque ripple - Cogging torque ripple minimization techniques - Time sharing commutation strategy - Active disturbance rejection control - Motor optimization and torque ripple minimization.

Sensorless control for BLDC motor drives - control strategy - starting process for sensorless control - BLDC motor drive control circuits.

Applications of BLDC motor drives - Elevator-Door control system - Elevator traction machine system - Inverter air conditioner - Hybrid electric vehicles.

1. Krishnan, R., 'Permanent Magnet Synchronous and Brushless DC Motor Drives', CRC Press, Taylor and Francis group, New York, 2010.
2. Xia, C.L., 'Permanent Magnet Brushless DC Motor Drives and Controls', John Wiley & Sons Singapore Pte. Ltd., Singapore, 2012.
3. Miller, T.J.E., 'Brushless Permanent Magnet and Reluctance Motor Drives', Oxford University Press, Oxford, 1989.