POWER ELECTRONICS AND DRIVE SYSTEMS

A wide variety of power electronics applications is presented, including industrial motor drives, energy storage systems, renewable energy sources, VAR.

Through these devices, the power delivered by these systems is cleaner and has a higher associated power factor. Motor drives are found in pumps, blowers, and mill drives for textile, paper, cement and other such facilities. Power Electronics Applications 1. Normal operation of CSIs and VSIs can be classified as two-level inverters because the power switches connect to either the positive or the negative DC bus. Drives may be used for power conversion and for motion control. The trains obtain their power from power lines. Note that in a cycloconverter, unlike other converters, there are no inductors or capacitors, i. Carrier-based and space-vector modulation techniques are used for multilevel topologies. A string converter is used in a system that utilizes photovoltaic cells that are facing different directions. In these applications, the turbine speed usually varies causing changes in voltage frequency and sometimes in the magnitude. In order to improve these values PWM can be used instead of the other methods. Due to added complexity and number of semiconductor devices, multilevel inverters are currently more suitable for high-power high-voltage applications. If full over-modulation is used in conjunction with SPWM the inverter is said to be in square-wave operation. Matrix converters are lighter, more compact and versatile than other converter solutions. Free Shipping No minimum order. Power electronic devices are utilized in these systems to convert the generated ac voltages into high-voltage direct current HVDC. The digital circuit utilized for modulating signals contains a switching pulse generator, a shorting pulse generator, a shorting pulse distributor, and a switching and shorting pulse combiner. This switching strategy permits the highest possible output voltage and reduces the reactive line-side current. Unlike the bipolar PWM technique, the unipolar approach uses states 1, 2, 3 and 4 from Table 2 to generate its AC output voltage. Power Diode 2. Twelve-Pulse Diode Rectifier 4. If the over-modulation region, ma, exceeds one, a higher fundamental AC output voltage will be observed, but at the cost of saturation. With the use of these components, the user can delay the firing angle in a wave which will only cause part of the wave to be in output. Conversely, VAR compensation is possible in a similar configuration where output currents lead line voltages to improve the overall power factor. The same methods are utilized for each phase, however, switching variables are degrees out of phase relative to one another, and the current pulses are shifted by a half-cycle with respect to output currents. This keeps the magnitude of the phase voltages identical, but out of phase with each other by degrees. The first change that is first noticed is that matrix converters utilize bi-directional, bipolar switches. Also, creating a simulation is both cheaper and faster than creating a prototype to use for testing. Any input phase and output phase can be connected together at any time without connecting any two switches from the same phase at the same time; otherwise this will cause a short circuit of the input phases. A direct matrix converter with three-phase input and three-phase output, the switches in a matrix converter must be bi-directional, that is, they must be able to block voltages of either polarity and to conduct current in either direction. If both switches in a leg were on at the same time, the DC source will be shorted out. If a triangular carrier is used with sinusoidal modulating signals, the CSI is said to be utilizing synchronized-pulse-width-modulation SPWM. This selection is based on modulating techniques, which include carrier-based PWM, selective harmonic elimination, and space-vector techniques.