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Laboratorio L.C.D.A. del Departamento de Ingeniería Eléctrica

"Multi-Level Three-Phase Current Source Inverter based AC Drive for High Performance Applications"

This work presents a three-level three-phase current source based converter for adjustable speed applications. The topology obtains all the benefits of multi-level topologies such as reduced harmonic distortion in voltage and current waveforms as well as a symmetrical sharing of the load power among the power valves. It is shown that the dc link voltage balancing issue found in multi-level voltage source topologies is also found in the proposed topology; however, in this case, the issue is the balancing of the dc link currents. It is found and presented a simple closed control loop that keeps the dc link currents perfectly balanced and operates independently of the additional control loops. The preliminary results show very low distorted voltage and current waveforms at the motor side of the topology, which makes it suitable for high performance ac drives. As expected, any modulating technique can be used to gate the arrange of power valves; in this document, a carrier based PWM technique is used to illustrate the gating signal generation method. The document presents the power topology, the model in the stationary abc frame, a simple carrier based modulating technique that allows the dc link current balancing, and a steady state analysis and comparison.

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