An Efficient High Performance Voltage Decoupled Induction Motordrive With Excitation Control

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Summary

The state of the art in indirect slip frequency-controlled induction motor drive systems is fast response, high performance, voltage decoupling control. However, decoupling control needs to operate at a constant rotor flux, which makes energy conversion inefficient. A variable-flux decoupling model of a voltage-fed induction motor which provides optimal efficiency and quick response is proposed. An optimization scheme determines the flux level for maximum efficiency at any operating condition, and a coordination controller assures quick torque response without torque pulsations. Application to a 100 hp and a 7.5 hp motor shows that a substantial saving in controllable losses during low-load operation is possible while maintaining high performance