

A Control System For A Slip-Ring Induction Motor (SRIM) And Method For Controlling the SRIM

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ABSTRACT

The control system (800) for SRIM comprises: a first control module (801) configured to control a stator side of the SRIM using Rotor Flux-based Field- Oriented Control (RFOC), wherein the first control module (801) is implemented in a Digital Signal Processor (DSP) configured to generate switching signals for the stator side of the SRIM; and a second control module (802) configured to control a rotor side of the SRIM using Direct Torque Control (DTC), wherein the second control module (802) is implemented in a DSP configured to generate switching signals for the rotor side of the SRIM. The first control module (801) calculates the rotor flux based on stator side currents and rotor side currents in a rotor flux reference frame while the second control module (802) estimates flux required for DTC by transforming the flux calculated by the first control module (801) into the rotor reference frame via a coordinate transformation.

KEY APPLICATION AREAS

1. Industrial Motor Drives & Automation.
2. Cranes, Hoists, and Conveyors.
3. Variable-Speed Drive Systems.
4. Heavy-Duty Manufacturing Equipment.
5. Power and Process Industries.
6. High-Performance Motor Control Systems.

POTENTIAL USE

1. Precise control of Slip-Ring Induction Motors (SRIMs) in industrial applications.
2. High-torque and variable-speed operation for cranes, hoists, and conveyors.
3. Improved motor performance during dynamic and transient load conditions.
4. Real-time torque, speed, and flux control using DSP-based controllers.
5. Enhanced power output and efficiency without increasing motor rating.
6. Super-synchronous motor operation with synchronized stator and rotor control.