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## Stable V/f Control System with Unity Power Factor for PMSM Drives

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### Abstract

This paper develops a scalar V/f control system for permanent magnet synchronous motor (PMSM) drives with two stabilizing feedback corrections: i) a voltage-vector speed correction using active power variation, in action only in transient states, and ii) a voltage amplitude correction based on unity power-factor regulation loop, employing reactive power. Motor / generator operating mode is allowed using the active power sign information. The proposed solution, inherent for sensorless control, is simple, requires reduced computation time, thus it is competitive for very-high variable speed PMSM drives like fans, pumps, micro gas-turbine generators, etc. Significant simulation results prove good performance for the proposed control structure in steady and transient states, for fast speed references and step rated load torque.

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