Abstract

Yasser Gaber A. Dessouky

Use of neural networks to enhance sensorless position detection in switched reluctance motors

Abstract This paper describe a novel method of sensorless position detection for a switched reluctance motor (SRM). The approach requires no special converter sensor circuitry, and does not rely on accurate prior knowledge of the magnetic characteristics of the motor. The technique is based on the use of the main converters to inject short, fixed duration, diagnostic current pulses simultaneously into two unenergised phases of a four-phase SRM. Previously, such a technique has been used to estimate the inductance of the motor phase windings and using stored knowledge of the relationship between inductance, rotor position, and current, to estimate rotor position. The approach described in this paper is novel in two respects. Firstly it does not rely on prior knowledge of the function L (?) but merely makes the assumption that L varies substantially as sin (N, ?), where N is the number of rotor poles, Secondly, the approach learns from good estimates of position and, once it has done this, is able to use this knowledge where performance of the estimation algorithm degrades (principally at low speeds of rotation).