Abstract

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Switched Reluctance Motor Drive from an AC Supply

In this study, a novel idea to drive SRM from single-phase AC supply is presented. Each stator winding is connected in series to thyristor to form one branch. All branches are connected in parallel to an AC supply. Thereby, a magnetic flux is generated between each pair of stator pole portions when a current is supplied to stator coil and repeated many cycles as long as the rate of change of inductance of stator phase is positive. The number of cycles of phase current depends on the ratio between rotor speeds to the supply angular frequency in radian per second. A magnetic attractive force occurs between rotor and stator pole portions as they approach one another, which produces motoring torque controlled by controlling switching delay angle of the switch. The advantage of this drive is its lower cost because the usage of simple shaft encoder and one thyristor per phase and its associated firing circuit, while the disadvantage of this drive is the more torque ripple and the deterioration of torque at high speed, and like most machine drives the supply current has high total harmonic distortion. A simulation model is presented and verified by experimental rig for two-phase SRM.