Effect of machine and balancer parameters on the pulling into step of three phase reluctance motors fed from a single phase supply

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Abstract

The operation of three-phase reluctance motors when fed from a single-phase supply has been found possible through the use of an appropriate capacitor as a phase balancer. This adds more flexibility to the modes of operation of such motors. Analysis of the associated transient process of this mode of operation has not yet been dealt with in the literature. It is the main objective of this paper to present a rigorous analysis of the transient behaviour of the three-phase reluctance motors fed from a single-phase supply. Particular attention will be focused on the pulling-into-step problem as affected by different motor- and supply-system parameters. The developed mathematical model is suitable also for analysing the transient behaviour of three-phase reluctance motors under balanced operating conditions.