Starting transients of three phase synchronous motors connected to a single phase supply

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Abstract

Balanced operation of three phase synchronous motors have been dealt with extensively in the literature. However, unbalanced operation has not received as much attention. One of the interesting unbalanced modes of these motors is their operation from a single phase supply. Such a mode of operation can be of special importance in remote areas where only single phase supply is available or in the case of an open circuited single line fault. In this paper, the possibility of operating three phase synchronous motors from a single phase supply through the use of a phase balancer capacitor is explored. The criteria for selecting the required phase balancer capacitor is presented and the analysis of the behaviour of such motors during the starting process is carried out. For this purpose, a rigorous state space mathematical model has been developed. The validity of this model have been verified experimentally