

**POWER QUALITY IMPROVEMENT FOR SOFT-START
INDUCTION MOTOR**

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ABSTRACT

This paper presents the improvement of power quality, mainly harmonic during soft starting of induction motor. Soft starters are used to avoid high inrush current and to achieve smooth starting of large induction motors. But, this takes harmonic-rich current especially while operating at large firing angles. AC voltage controller is used as soft starters in induction motors. Different types of filters such as series passive power filter (SPPF), shunt active power filter (SAPF), and shunt hybrid power filter (SHPF) are used in three-phase AC voltage controller. The effect of inserting various types of filter is to improve harmonic and reactive power compensation during soft starting. The advantages of proposed method are its simplicity, accuracy and fast response. Simulation is carried out using PSIM which has user friendly approach.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Nowadays induction motors are widely used in industry and residential appliances. The disadvantage of using induction motor is high inrush current during starting. The problem is more severe in areas where the loads represent a high portion of the power demand. Reduction of inrush current can be achieved by using soft starters. Energy saving can also be possible. Therefore, the starting process of the motor needs to be controlled thereby limiting its starting current. The traditional reduced voltage starting methods are star-delta starting and impedance starting. These method uses stepped variation of voltage whereas soft-start increases the voltage applied to the induction motor in a smooth manner. A 3-phase AC voltage controller is normally employed as a soft-start. However, the output of an AC voltage controller is rich in voltage and current harmonics which results in de-rating of the induction motor [1], [2].

Harmonics provide main problem in network like power losses and excess heat. Thus, harmonic limitation seems to be vital. Nowadays, power filters which are series passive power filters (SPPF), shunt active power filters (SAPF), and shunt hybrid power filter (SHPF) play effective role in distortion recognition and elimination. These filters are classified with respect to distortion determination strategy. SPPF is connected in series with distribution networks. The shunt passive power filter is placed across the incoming line and is designed to offer very low impedance to