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DESIGN AND SIMULATION OF SHUNT ACTIVE POWER FILTER FOR ASSIUT CEMENT COMPANY DC MOTOR DRIVE

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Abstract:

This paper introduces a design and simulation of an adaptive shunt active power filter (APF) for harmonic mitigation and power factor (PF) correction of 630 kW DC motor (DCM) drive (called By Pass Motor Fan in production line # 2 in Assiut cement company). Due to the presence of power thyristor converters, a very bad PF and different harmonic components exist in the system, especially in the input current to the DCM drive. All measurements needed for complete analysis at the Medium Voltage (MV) supply source side and at Low Voltage (LV) motor drive side are performed using professional power quality (PQ) analysers and their associated software programs. The studied system is modelled and simulated using MATLAB Simulink software. The instantaneous active and reactive current components i_d and i_q control method is used in this study to drive the shunt active filter. Therefore the harmonic contents at MV supply source and at point of common coupling (PCC) with the DCM drive are reduced to the standard values. Both digital simulation and practical measurements are presented and consistent. The results show that a good dynamic and steady-state performance of the system is achieved

Keywords:

Active power filter, DC motor, harmonics mitigation, power factor correction and power quality

Published In:

Journal of Engineering Sciences, Assiut University, Faculty of Engineering , 41-6 , 2244 - 2259