

Harmonic Decomposition and Power Quality Analysis of a Six-Phase Induction Motor Traction Drive with Fast Fourier Transform

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Abstract

This paper presents an analysis of harmonic decomposition and power quality analysis of a six-phase asynchronous motor drive model designed for traction systems, by the Fast Fourier Transform tool. The six-phase asynchronous motor is fed by a Voltage Source Inverter. The goal is to determine whether the proposed 6-phase traction system is viable to prototype and test from the standpoint of power quality and electromagnetic compatibility. The resulting power quality distortion by harmonics suggest that the proposed traction system generates acceptable distortions, through but for which the accepted FFT analysis, in the IEEE Standards 1459-2010 and 519-2014, is not an efficient tool for analysis of highly dynamic traction systems. For a good representation of power distortions, a different standard should be developed and employed.

Keywords: induction motors, fast Fourier transforms, Voltage source inverters, Power quality, Power system harmonics, tools, harmonic analysis, modeling

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