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Weighting Factors Optimization of Predictive Torque Control of Induction Motor by Multi-objective Genetic Algorithm

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Abstract

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Abstract:

This study investigates the application of a multi-objective genetic algorithm for the obtaining of a set of weighting factors suitable for use in the model predictive torque control (MPTC) of an induction motor variable speed drive. The MPTC approach aims at minimizing a cost function at each step and has been highlighted for its fast torque response, easy incorporation of system constraints and absence of voltage modulators. Nevertheless, its structure contains weighting factors in the cost function, which lacks an analytical design procedure. The non-dominated sorting genetic algorithm II (NSGA-II) was designed for a trade-off between torque and flux performances and average switching frequency of the system. Experimental results showed NSGA-II offered a Pareto set of feasible solutions, so that torque ripple, flux ripple or average switching frequency can be minimized, depending on the solution chosen. Its application constitutes a project tool for MPTC weighting factors that adjusts several factors concomitantly and incorporates desired restrictions.

Published in: IEEE Transactions on Power Electronics (Early Access)

Page(s): 1 - 1

DOI: 10.1109/TPEL.2018.2834304

Date of Publication: 07 May 2018

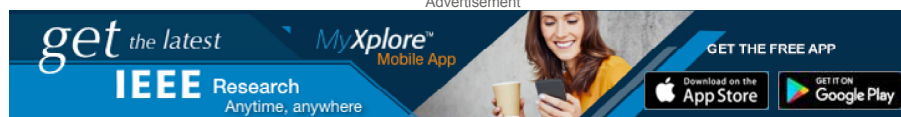
Publisher: IEEE

ISSN Information:

Sponsored by: IEEE Power Electronics Society

Funding Agency:

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