# An Improved Model Predictive Control Method to Drive an Induction Motor Fed by Three-Level Diode-Clamped Indirect Matrix Converter

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## Abstract

In this paper, an improved model predictive control method is proposed to drive an induction motor fed by a three-level matrix converter. The main objective of this paper is to present a novel method to increase the switching frequency at a constant sampling time. Also, it is analytically discussed that increasing the switching frequency not only can decrease the motor current ripples, but it can also significantly reduce its torque ripples. Finally, this study demonstrates that reducing the motor current ripple will improve the quality of the supply current. To be the accurate model and validate the motor drive system, a co-simulation method, which is a combination of FLUX and MATLAB software packages, is employed to find the simulation results. The findings indicate that the proposed method diminishes the THD of the supply current up to 26% approximately. Furthermore, increasing the switching frequency results in the torque ripple reduction by up to 10% almost.

**Keywords:** model predictive control, three-level matrix converter, induction motor, switching frequency, torque ripple

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