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Experimental Validation of Vector Control of a Matrix Converter Fed Induction Generator for Renewable Energy Sources

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Abstract

Grid integration of induction generators driven by renewable energy sources requires power electronic converters to transform the grid voltage into an output voltage of appropriate magnitude and frequency. This paper presents an experimental validation on vector control of a matrix converter fed induction generator. Operation of a matrix converter is presented. The principle of vector control for induction generators is described. A matrix converter prototype 3 kW, 230V, 50Hz is developed. Rotor speed and flux are digitally controlled by 32-bit microcontrollers TMS320F28069. The experimental results confirm viability of the proposed control method.

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1. Introduction

Nowadays, power electronic converters play an important role in the integration of renewable energy sources to the grid. They are capable of converting ac voltages with variable magnitude and frequency to desirable ac voltages as recommended by grid requirements. These power converters can be categorized into two types:

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