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FEEDBACK LINEARIZING FIELD-ORIENTED CONTROL OF INDUCTION GENERATOR: THEORY AND EXPERIMENTS

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Authors

S. Peresada, S. Kovbasa, S. Korol, N. Zhelinskyi

National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”,
Peremohy av., 37, 03056, Kyiv, Ukraine,
e-mail: sergei.peresada@gmail.com

Abstract

A novel field-oriented vector control for induction generators is presented. Design procedure is based on indirect field orientation concept and exploits output-feedback linearizing technique for voltage controller design. Proposed solution guarantees asymptotic rotor flux and DC-link voltage regulation together with linear nominal dynamics of the DC link voltage error. Decomposition into voltage and current-flux subsystems, based on the two-time scale separation, allows to use a simple controllers tuning procedure. Results of comparative experimental study with standard indirect field-oriented control, having linear PI voltage controller, are presented. It is shown that designed controller, in contrast to standard solutions, provides system performances stabilization when speed is varying. Proposed control algorithm

is suitable for standalone and grid connected (via suitable inverter) energy generation systems with variable speed operation. References 10, figures 8, table 1.

Key words: induction generator, field-oriented control, energy generation system.

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