Title: A new control strategy with saturation effect compensation for an autonomous induction generator drivenby wide speed range turbines

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Abstract: This paper presents a variable speed autonomous squirrel cage generator excited by a current-controlled voltage source inverter to be used in stand-alone micro-hydro power plants. The paper proposes a system control strategy aiming to properly excite the machine as well as to achieve the load voltage control. A feed-forward control sets the appropriate generator flux by taking into account the actual speed and the desired load voltage. A load voltage control loop is used to adjust the generated active power in order to sustain the load voltage at a reference value. The control system is based on a rotor flux oriented vector control technique which takes into account the machine saturation effect. The proposed control strategy and the adopted system models were validated both by numerical simulation and by experimental results obtained from a laboratory prototype. Results covering the prototype start-up, as well as its steady-state and dynamical behavior are presented. (C) 2011 Elsevier Ltd. All rights reserved.

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