

Reliability Indices Evaluation of SEIG Rotor Core Magnetization with Minimum Capacitive Excitation for WECs

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Abstract : This paper presents reliability indices evaluation of the rotor core magnetization of the induction motor operated as a self-excited induction generator by using probability distribution approach and Monte Carlo simulation. Parallel capacitors with calculated minimum capacitive value across the terminals of the induction motor operating as a SEIG with unregulated shaft speed have been connected during the experimental study. A three phase, 4 poles, 50Hz, 5.5 hp, 12.3A, 230V induction motor coupled with DC Shunt Motor was tested in the electrical machine laboratory with variable reactive loads. Based on this experimental study, it is possible to choose a reliable induction machine operating as a SEIG for unregulated renewable energy application in remote area or where grid is not available. Failure density function, cumulative failure distribution function, survivor function, hazard model, probability of success and probability of failure for reliability evaluation of the three phase induction motor operating as a SEIG have been presented graphically in this paper.

Keywords : residual magnetism, magnetization curve, induction motor, self excited induction generator, probability distribution, Monte Carlo simulation

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