INVESTIGATION OF PARAMETERS OF A STAND ALONE POWER GENERATING SYSTEM, USING AN INDUCTION MACHINE IN SINGLE- PHASE GENERATOR MODE

ETD

By

N.G.D. Wijesiriwardene

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Department of Electrical Engineering
Faculty of Engineering
University of Moratuwa
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Abstract

In Sri Lanka only around 35% of rural population has reached grid electricity. Therefore stand alone power generation systems will be a major option to provide electricity to rural population as we are rich with hydro resources.

In rural electrification, even though DC generators and synchronous generators are used, induction generator has become common in use due to more convenient features like ready availability, simplicity, reliability and robustness.

Now the single-phase power with a three- phase induction machine has become an economical options to generate power in stand- alone power generating systems. It is now widely used in Pico scale stand alone power generating systems in Sri Lanka.

When a three- phase induction motor is used as a generator in single- phase mode, it should be designed to operate near the best operating point, to provide maximum power output and minimum unbalance. Literatures on this area of subject and published test results are few; manufactures of motors rarely show an interest to measure and publish test results of their standard machines in generator mode [2].

In this situation it is difficult to find data in this type of generators installed in this country also. It was seen that to find and analyze data of stand alone power generating systems and to study about its parameters will be useful due to the poor availability of literature in this area.

Also according to the investigations made, many Pico scale hydro developers seems not paid due attention on whether their plants operate at optimum power out put at minimum unbalance.

This study was basically focused to investigate the parameters of a stand alone single phase power generating system using a three phase induction generator to find the system behavior, specially at minimum unbalance with a maximum power output. The study also includes the analysis of the system to find the behavior of the total(generating and distribution) system.

DECLARATION

I hereby declare that this submission is my own work and that, to the best of my knowledge and behalf, it contains no material previously published or written by another person nor material, which to substantial extent, has been accepted for the award of any other academic qualification of an university or institute of higher learning except where acknowledgment is made in the text.

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N G D Wijesiriwardene

December 2003

UOM Verified Signature

Dr. J. P. Karunadasa

Project Supervisor

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