



Faculty of Engineering



Cairo University

PRIMARY FREQUENCY CONTROL FOR WIND TURBINE

By

Abdulhameed Shueai Hassan Alsharafi

A thesis submitted to the
Faculty of Engineering at Cairo University
in partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Electrical Power and Machines Engineering

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Title of thesis:

Primary Frequency Control for Wind Turbine.

Key Words:

Frequency regulation, wind turbine, inertial controller, pitch controller.

Summary:

Primary frequency controls for wind turbine are discussed. Variable speed wind turbine connected with hydro turbine is simulated using Simulink/Matlab. Different scenarios are analyzed and compared, where several primary frequency control are used to support the frequency response after system disturbance with two different cases of wind speed, the first is high wind speed and the second is low wind speed. The thesis proposes two new controllers' structure based on combination strategy between different controllers. The best combined controller that leads to reducing the rate of change of frequency and raising the frequency nadir.

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Dedication

This work is dedicated to my mother, my father's spirit & my family

To my wife & my daughters

To my friends

To my university professors

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