



HARMONIC RESONANCE OVERVOLTAGE DURING MAIN POWER TRANSFORMER ENERGIZATION IN GRID-CONNECTED WIND FARMS

By

Ahmed Fouad Ibrahim Ahmed

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

**FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

Harmonic Resonance Overvoltage during Main Power Transformer Energization in Grid-connected Wind Farms

Key Words:

Transformer energization, Harmonic resonance overvoltage, Natural frequency, Wind farm feeders, Grid-connected wind farms.

Summary:

This thesis introduces a new study about the produced harmonic resonance overvoltage (HRO) during the energization of the main power transformers in grid-connected wind farms. The thesis studies some affecting factors on the produced HRO. It investigates the effect of the lengths of the overhead transmission lines (OHTLs) and the unloaded on-line transformer on the HRO. In addition, it investigates the effect of the wind farm feeders, connected to the secondary side of the on-line transformers, on the HRO.

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Dedication

*This work is gratefully
dedicated to:*

*My parents, my wife, and
my little son Youssef*

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