



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكرو فيلم

# بسم الله الرحمن الرحيم



**HANAA ALY**



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التوثيق الإلكتروني والميكروفيلم



# شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

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**HANAA ALY**



# **ENERGY HARVESTING MAXIMIZATION BY INTEGRATION OF DG BASED ON ECONOMIC BENEFITS**

By

**Eng. Samar Gamal Abd El-Nasser**

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:**

ENERGY HARVESTING MAXIMIZATION BY INTEGRATION OF DG BASED ON ECONOMIC BENEFITS

**Key Words:**

Distributed Generation, Genetic Algorithm, Grey Wolf Optimizer, Particle Swarm Optimization, Whale Optimization Algorithm.

**Summary:**

In this thesis, the purpose of Distributed Generation systems (DGs) is to enhance the Distribution System (DS) performance to be better known with its benefits in the power sector as installing Distributed Generation (DG) units into the DS can introduce financial and technical benefits. Those benefits can be obtained, if the DG units' site and size is properly determined. The aim of this thesis is studying and reviewing the effect of connecting DG units in the DS on Transmission Efficiency (TE), reactive power loss and voltage deviation in addition to the economical point of view with considering the interest and inflation rate. Genetic Algorithm (GA) is introduced to find the best solution to the distributed generation penetration problem in the DS. The result of GA is compared with Whale Optimization Algorithm (WOA), Particle Swarm Optimization (PSO), and Grey Wolf Optimizer (GWO). The Proposed solutions methodologies have been tested using MATLAB software on IEEE 33 standard bus system.

## **Disclaimer**

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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