بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

بعض الوثائق
الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصل

Cairo University

DESIGN OF A SELF-TUNABLE, VARIABLE-LENGTH PENDULUM FOR HARVESTING ENERGY FROM ROTATIONAL MOTION

By

Eng. Suzzan Abbas Hassan Abbas

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY

In

MECHANICAL DESIGN AND PRODUCTION ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

Design of a Self-Tunable, Variable-Length Pendulum for Harvesting Energy from Rotational Motion

Key Words:

Energy Harvesting; Pendulum; Reciprocating Motion; MMR system, Frequency detection, Self-tunable harvester, Tuning algorithm.

Summary:

In this thesis, the design of a self-tunable energy harvester based on pendulum oscillation low-frequency vibration energy from horizontal excitations. The device is equipped with mechanical motion rectifier MMR to improve the output power. The frequency adjustment of the system has been demonstrated experimentally by changing the length of the pendulum rod automatically through a complete control circuit to achieve a state of resonance.

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 reference section.

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Signature:

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First of all, I want to thank God for helping me to complete and finish this work after a long series of efforts, and it is a great pleasure to express my deep gratitude and indebtedness to my supervisor Prof. Dr. Tarek Abdel Sadek Osman, Professor of Mechanical Design and Production Department, Cairo University for giving me the opportunity to work under him and lending every support at every stage of this work and for his guidance, moral support and affection through the course of my work.

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