Ain shams university
Faculty of Engineering

OPTIMAL DESIGN OF TRUSSES WITH BUCKLING CONSTRAINTS

BY

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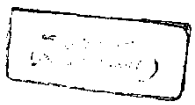

A THESIS SUBMITTED IN
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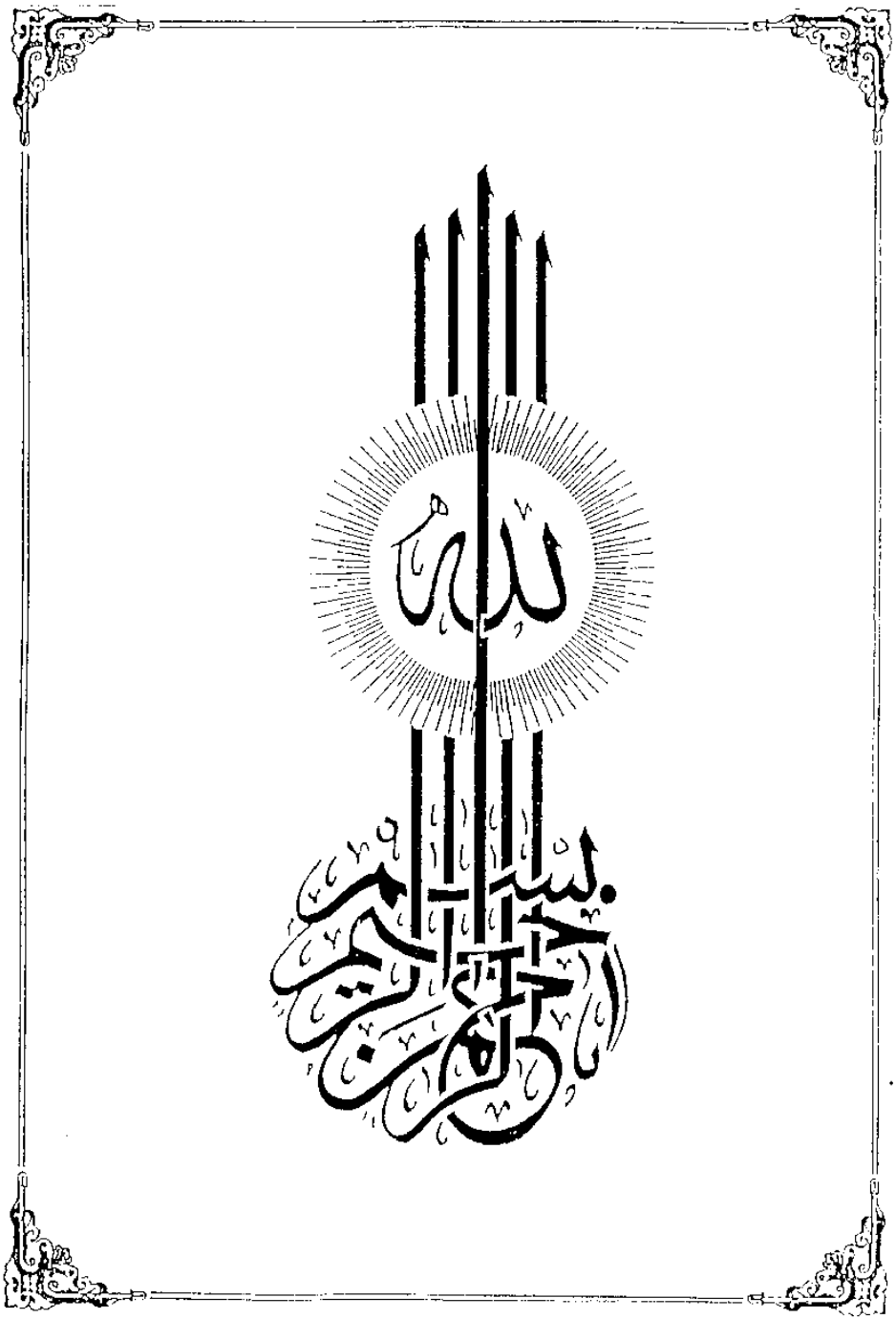

STATEMENT

This thesis is submitted to Ain Shams University for the Degree of Master of Science in Civil Engineering (Structural Engineering).

The work included in this thesis was carried out by the author in the department of structural engineering Ain Shams University form Nov. 1990 till Jan. 1994.

No part of this thesis has been submitted for a degree or a qualification .

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DEDICATION

To My Parents

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Abstract of the M. Sc. Thesis
submitted by ENG. MOHSEN FATEHY AHMAD

Title of Thesis

OPTIMAL DESIGN OF TRUSSES WITH BUCKLING CONSTRAINTS

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Registration Date: 10/12/1990 Examination Date: 5 /3 /1994

Abstract

This thesis deals with the problem of optimizing trusses with buckling constraints. The development of structural optimization is presented with a comperehensive review of the previous researches. The mathematical basis of some common methods are explained briefly. The optimality criteria methods are introduced with a recurrence relation for Lagrange multipliers and Newton-Raphson procedure. Both approximation concepts and dual methods are displayed to increase the efficiency of solution. Several examples are solved to verify the applicability of the presented methods. Optimum design of reticulated domes is investigated taking into account the type of dome, height to span ratio, cases of loading and design formulae. The critical buckling loads are determined for the optimized domes with different height to span ratios. A brief summary, and conclusions are given. Suggestions for future extension are presented at the end.

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