

Sudan University of Science and Technology
College of Graduate Studies

**Development of Geometrically Nonlinear Finite
Element Program Using Plane Stress/Strain
Elements based on Engineering and True Stress
Measures**

تطوير برنامج حاسوب للتحليل اللاخطي بطريقة العناصر المحددة
لمنشآت المستوي الواحد الإجهاد والانفعال بناءً على قياس الاجهادات
الهندسية و الحقيقية

By

Nuha Moawia Akasha Hilal

B.Sc (Hon), Sudan University of Science and Technology, 1997

M.Sc. Sudan University of Science and Technology, 2002

A thesis submitted for the fulfillment of the requirements of the
degree of Doctor of Philosophy in Civil Engineering (Structures) to
Civil Engineering Department, College of Engineering

October 2009

Dedication

To my family

Acknowledgements

I have great pleasure in expressing my deep sense of gratitude, indebtedness and thankfulness towards my supervisor ***Dr A/Elrahman Elzubier Mohamed*** for his invaluable guidance, constant supervision, continuous encouragement support and great patience throughout my entire undergraduate, graduate studies and researches. His commendable suggestions, critical views, constructive criticisms and careful review of this thesis has greatly improved this work and helped me in its successful completion.

My foremost thanks are due to my *family* and *friends* for their encouragement, support, love and moral boosting which keep me going always.

I would like to thanks ***Dr. Redzuan Abdullah*** at the faculty of Civil Engineering, University Technology Malaysia for his helpful suggestions.

Special thanks are due to the staff of Civil Engineering Department, Sudan University for their unlimited help and support