REACTIVE POWER COMPENSATION FOR A DISTRIBUTION SYSTEM WITH DISTORTED SYSTEM VOLTAGES: A NEW APPROACH

by

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Thesis submitted in fulfillment
of the requirements for the degree
of Master of Science in Electrical Engineering

UNIVERSITI TEKNOLOGI MARA

September 2001

UNIVERSITI TEKNOLOGI MARA

PUSAT PENGAJIAN SISWAZAH

In accordance with the academic regulations of Universiti Teknologi MARA, the final examination on the thesis:

"Reactive Power Compensation for a Distribution System with Distorted System Voltages: A New Approach"

by the candidate **Mohamed Fau'ad Faisal** was held on 17th June 2002.

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Master of Science in Electrical Engineering

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13th February 2003

ACKNOWLEDGEMENT

In the name of Allah, the most merciful and the most compassionate.

I would like to thank my supervisor, Dr.Titik Khawa Abdul Rahman for her guidance and assistance in helping me through this research work and in the preparation of this thesis. I am also thankful to the Department of Electrical Engineering and the Centre for Graduate Studies, Universiti Teknologi Mara (UiTM) for allowing me to utilize in full the library and its facilities during my studies. I would also like to thank my wife, Humaira' Abdul Rahman, for providing me with unlimited support, confidence and being my source of inspiration. Finally, I would also like to express my gratitude to my parents and my children, Mohd Hafiszul Amin, Mohd Hafiszul Shafiq and Hafizatul A'fifah, for being patient during the two and a half years and giving me the support to enable me to finish my studies.

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Chapter 1 Introduction

The power system industry in Malaysia (and the world as a whole) is concentrated on the business of power generation, power transmission and power distribution. These various businesses can be directly identified based on the various voltage levels present in the power systems. Power stations, which are typically located farther from populated area, generate electricity at voltage levels between 11-25 kV. These voltages will then be increased to higher voltages of 132 kV-275 kV by step-up power transformers located at the power stations.

Electrical power will be 'transported' through transmission lines to populated or industrial areas where the voltages will be reduced to the subtransmission voltage levels of 11 kV, 22 kV or 33 kV through step-down power transformers at the main intake substations. The electrical power is then delivered to customers via the underground or overhead distribution systems. The distribution system fed from the distribution transformer stations, supplies power to the domestic or industrial and commercial consumers. Figure 1-1 depicts schematically the structure and components of a typical power system.

The standard voltages, frequencies and their range of variation in the distribution system in Malaysia have been specified in the Electricity Supply Act 447 and the Electricity Supply Rules 1994. The distribution system must be operated at all times at normal