POWER ELECTRONICS AND DRIVES

Mohammed T. Lazim

First Edition

Published with the support of Philadelphia University-Jordan
Dedicated

To my family:

Ilham – Chief Senior Pharmacist – Wife
Sawsan – Bsc. Chemical Engineer – Daughter
Ahmed – Msc. Electronic and Communications Engineer – Son
Zahra – Msc. Computer and Control Engineer – Daughter
Noor – Bsc. Architect – Daughter
Sura – Bsc. Pharmacist – Daughter
Ali – H.N.D. Electrical Engineering – Son
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Mohammed T. Lazim is employed by Philadelphia University in Jordan as Professor of Electrical and Electronics Engineering. Previously, He was employed by Nahrain University in Iraq as Head of Electronics and Communications Engineering Department and Chief Consultant of Nahrain University Engineering Bureau. Lazim received his B.Sc. and M.Sc. degrees in Electrical Engineering from the University of Baghdad in 1967 and 1975 respectively, and Ph.D. degree in Electrical and Electronics Engineering from the University of Bradford in the United Kingdom in 1981. Previously, He worked as an Associate Professor of Electrical Engineering and Head of the Electrical and Electronics Engineering Department at the Military Engineering College at Baghdad-Iraq. He also worked as a Visiting Associate Professor of Electrical Engineering at the University of Technology-Iraq and as post graduate lecturer at the Electrical Engineering Department at University of Baghdad, and at the Control and Computer Engineering Department at University of Technology-Baghdad, Head of Computer Science Department, and Head of the Operational Research Department at Mansour University College at Baghdad-Iraq. Lazim was also previously employed as a Design, Development and Consultant Engineer with the Ministry of Defence, Ministry of oil, Ministry of Industry and Ministry of Electricity in Iraq.

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During the last fifty years the field of power electronics and drives has become more diversified and broader in scope. Power electronics has found an important place in modern technology being a core of power and energy control. Almost all the new electrical and electromechanical equipment contain power electronics circuits.

This book *Power Electronics and Drives* is intended as a textbook for courses on Power Electronics and Motor Control for junior and senior undergraduate students in Electrical; Electronics and Communication; Electronics and Telecommunication; Instrumentation and Control; Electronics and Instrumentation; Industrial Electronics, and Mechatronics Engineering. The content of the book and the level of the presentation are designed to suit the preparation and needs of the average engineering student. The text is written for some flexibility in the order of the topics. The textbook is unique and differs from the general treatment of the subject, through the style of presentation of the material, and through the addition of recent theories and applications of power electronics.

The book consists of two parts. Part-I (Chapter 1 to 9) provides good background and a comprehensive description on power electronics subjects. Part-II (Chapter 10 to 15) covers the motor drive systems, which undergraduate students will also find useful. The text can also be utilised as a textbook for graduate students and as a reference book for technicians and engineers of respective specialties.

A large number of solved examples, theoretical exercises and numerical problems, all of degree standard, have been included in the text. The solution to illustrative examples covering almost all topics and sub-topics makes the entire presentation easy to follow. Exercises and numerical problems with answers given at the end of each chapter help the students in evaluating their understanding of the subject.

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Within this book, every care and attention has been taken to eliminate misprints and errors. However, should the reader become aware of any inaccuracy or misprint that has crept in, then the author would be grateful if this could be brought to his attention. Also, any suggestion for improvement of the book will be acknowledged and well appreciated.

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