

Preface

This book is written primarily as an introduction to electrical energy systems. It is intended for students in electrical and other engineering disciplines, as well as being useful as a reference and self-study guide for the professional dealing with this important area. The coverage of the book is designed to allow its use in a number of ways including service courses taught to non-electrical majors. The organization and details of the material in this book enables maximum flexibility for the instructor to select topics to include in courses within the modern engineering curriculum.

The book does not assume a level of mathematical awareness beyond that given in undergraduate courses in basic physics and introductory electric circuits. Emphasis is given to an improved appreciation of the operational characteristics of the electrical apparatus discussed, on the basis of linear mathematical models. Almost every key concept is illustrated through the use of in-text examples that are worked out in detail to enforce the reader's understanding. The text coverage includes some usage of MATLAB™ to solve fundamental problems of basic performance characteristics to obtain analysis of power system devices.

The first chapter in this book provides a historical perspective on the development of electric power systems. While this topic is not an integral part of the conventional coverage in texts and courses in this area, this chapter should provide interesting insights into the influence of these developments on present day civilization. It is through an appreciation of the past developments and achievements that we can understand our present and forge ahead with future advances.

Chapters 2 to 8 deal with fundamental topics to be covered in courses in electric energy systems. Emphasis is given to practical aspects such as the main performance characteristics of the devices discussed and system applications. The importance of computer control in power system operations is highlighted in Chapter 8 where we discuss the structure and functions involved in a modern energy control center.

I have attempted to make this book as self-containing as possible. As a result, the reader will find that many background topics such as the per unit system and three-phase circuits are included in the text's main body as opposed to the recent trend toward including many appendices dealing with these topics. In studying and teaching electrical energy systems it has been my experience that a problem solving approach is most effective in exploring this rich area.

A textbook such as this could not have been written without the continuing input of the many students who have gone through many versions of its material as it was developed. My sincere thanks to the members of the many classes to whom I was privileged to teach this fascinating subject. I wish to acknowledge the able work of Elizabeth Sanford of DalTech in putting this

manuscript in a better form than I was able to produce. My association with the CRC Press LLC staff has been valuable throughout the many stages of preparing this text. I wish to express my appreciation to Nora Konopka and her continuous encouragement and support.

I owe a debt of gratitude to Dr. Leo Grigsby of Auburn University for suggesting that I write this book.

It is always a great pleasure to acknowledge with thanks the continuing support of Dean Adam Bell of DalTech during the course of preparing this text. As has always been the case, the patience and understanding of my wife Dr. Ferial El-Hawary made this project another joy to look forward to completing. It goes without saying that our sons and daughter deserve a greater share of my appreciation for their continuous understanding.

M.E. El-Hawary