

# Preface to the Fourth Edition

This book is exclusively designed for use as a text for an introductory course in Network Analysis offered to first-year undergraduate engineering students of Jawaharlal Nehru Technological University. The primary goal of this text is to enable the student to have a firm grasp over basic principles of electric circuits and develop the student's understanding of circuits and the ability to design practical circuits that perform the desired operations. Emphasis is placed on basic laws, theorems and techniques which are used to develop a working knowledge of the methods of analysis used most frequently in further topics of electrical engineering.

Each chapter begins with principles and theorems together with illustrative and other descriptive material. A large number of solved examples showing students the step-by-step processes for applying the techniques are presented in the text. Several questions in worked examples have been selected from the university question papers. As an aid to both the instructor and the student, objective questions and the tutorial problems provided at the end of each chapter progress from simple to complex. An extensive reorganization of the book has been implemented to make it easier for students to use. The most important change in this edition is the addition of P-Spice simulation examples at the end of most of the important chapters. In addition, the chapters with P-Spice simulation examples also include P-Spice simulation problems. Answers to selected problems are given to instill confidence in the reader. Due care is taken to see that the reader can easily start learning Network Analysis without prior knowledge of mathematics. Another major highlight of the new edition is the inclusion of 2008 solved university question papers (4 Sets).

The basic approach of the previous edition has been retained. All the elements with definitions, basic laws and configurations of the resistive circuits, star—delta transformation are introduced in the first chapter. AC fundamentals are introduced in Chapter 2 which include voltage—current relation of elements, and complex impedance. Power and power factor concept is discussed. A brief study of coupled, tuned and magnetic circuits is also

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introduced in this chapter. Resonance phenomena in series, parallel circuits and locus diagrams are presented in Chapter 3. A comprehensive study of polyphase systems and power measurement in both balanced and unbalanced circuits is presented in this chapter. Graph theory has been written in an easy-to-understand manner in Chapter 4. The analysis of DC resistive circuits is also discussed in this chapter. Network theorems on resistive circuits are presented in Chapter 5. The steady-state analysis of AC circuits, including network theorems, are also discussed in Chapter 5. The parameters of two-port networks and their inter-relations are discussed in Chapter 6. Problems, tutorials and objective questions on dependent sources are included in chapters 1 to 6.

The transient behavior of AC and DC circuits and their response is discussed in Chapter 7. Laplace transforms and their applications are also presented in Chapter 7. Various types of basic filters, attenuators and composite filters are discussed in Chapter 8. A chapter on Introduction to P-Spice is included. The book also includes brief topics of Fourier series, Fourier transforms and the  $j$  operator.

**Web Supplements** include Solved Question Paper 2006 and 2007, 6 Model Question Papers and 200 additional objective type questions based on the examination pattern.

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**A SUDHAKAR  
SHYAMMOHAN S. PALLI**