

Mastering AC Circuit Analysis

A Guide to Three-Phase and Two-Port Networks

This book is your practical guide to understanding and analysing AC power systems and electrical circuits. It begins with three-phase generation, explaining how electricity is produced and how these principles underpin the operation of the national grid, including why power is transmitted at high AC voltages. You then progress to three-phase systems, learning how to analyse balanced and unbalanced star and delta loads, calculate three-phase power, and understand the importance of power factor and its correction. The book introduces transmission lines, showing how primary line constants describe signal behaviour and lead to effects such as standing waves. Mastering AC Circuit Analysis teaches you the essential tools used to analyse AC systems, including two-port networks, star–delta transformations, filter design, and transformer modelling. You will also learn how harmonics, induction motors, and Laplace transforms help engineers understand and predict circuit behaviour. This book equips students and engineers with the analytical skills and confidence needed to tackle real-world electrical power engineering problems, making it an ideal companion for advanced study and professional practice.

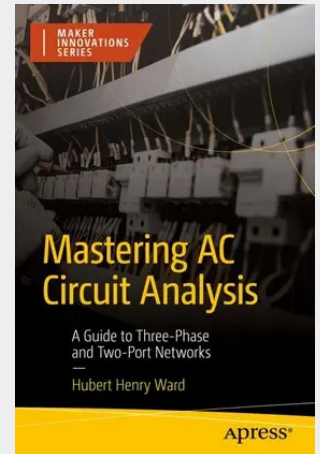
What You'll Learn - Analyze three-phase balanced and unbalanced loads. - Learn what transmission lines are and how to analyze them. - Analyze two-port networks and use ABCD parameters. - Analyze circuits with multiple loops using advanced mesh analysis techniques. - Learn how to carry out star to delta transforms. - Master passive filters such as band top, band pass and the notch filter - Use Laplace transforms to predict the system behavior of a series RLC circuit.

Who This Book Is For The book is targeted at readers who want to extend their understanding in electrical engineering moving on from their first year of study to their second and higher years of study including Higher National and degree courses in electrical engineering. It can also be used as a reference material for engineers who need reinforce their understanding electrical engineering.

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74,89 €
69,99 € (zzgl. MwSt.)

vorbestellbar, Erscheinungstermin ca.
November 2026

Artikelnummer: 9798868831522
Medium: Buch
ISBN: 979-8-8688-3152-2
Verlag: Apress
Erscheinungstermin: 27.11.2026
Sprache(n): Englisch
Auflage: 1. Auflage 2026
Serie: Maker Innovations Series
Produktform: Kartoniert
Seiten: 336
Format (B x H): 155 x 235 mm

