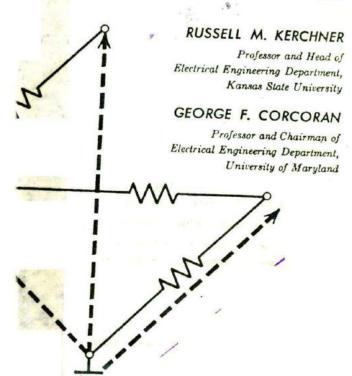
## Alternating-Curren Circuits

**Fourth Edition** 

(a)

Russell M Kerchner George F Corcoran

## Alternating-Current Circuits 4th edition



4th Edition Seventh Reprint 2004

Authorized reprint of the edition published by
John Wiley & Sons, Inc., New York and London.

Copyright, © 1960 by John Wiley & Sons, Inc.

All Rights reserved. No part of this book may be reprodused in any form without the written permission of John Wiley & Sons, Inc.

Library of Congress Catalog Card Number: 60-11724.

Printed in Japan

By TOPPAN PRINTING COMPANY, LTD.

## Preface

The approach to alternating-current circuits which has been employed in previous editions has been found to be reasonably satisfactory in introducing the subject to students of electrical engineering and physics and has therefore been retained in this edition. Numerous additions and modifications have been made throughout the book where experience has shown the need for improvement. The changes have been made with a view toward making the book more understandable to the student. An introductory chapter on network concepts has been added in order to give the student a deeper insight into the general methods of network analysis. Network variables, topology, and duality are considered. For those students who have a knowledge of Kirchhoff's laws and some experience with solving networks employing direct currents it is possible to begin study of this edition with Chapter II. However most students will likely find Chapter I a good review and many will find in it a considerable amount of material which is new and of value in a study of more advanced network theory.

Because of the great advances in electronics and the consequent need for additional circuit theory, nearly all students now follow the first course in alternating-current-circuit theory with a rather intensive course in network theory and in many instances with some network synthesis. For courses of this kind some knowledge of complex frequency and poles and zeros is highly desirable. These subjects have been introduced in this edition, first in Chapter V where steady-state analysis is considered and again in Chapter XIV where the transient analysis of the RLC series circuit is treated.

In order not to interfere with the vector terminology of electromagnetic theory the term phasor has been adopted for a time-varying quantity which is handled by vector methods. The change from vector to phasor diagram is made in Chapter IV although as used in this book the distinction is unnecessary. To many electrical engineers a vector diagram will always be a vector diagram.

By certain reductions and eliminations, the book has been held to approximately the same size even though a considerable amount of PREFACE

material has been added. Some new kinds of problems have also been included at the end of some of the chapters.

The same and an area of the same of the sa

The state of a superstant state of the state

and the company of the state of the state of

and the state of t

are many to time size and thrown a considerant danger, of

RUSSELL M. KERCHNER GEORGE F. CORCORAN

June, 1960

## Contents Contents

Network Concepts	-
Instantaneous Current,	
Voltage and Power	45
Effective Current and Voltage	
— Average Power	85
Phasor Algebra (As Applied	•
to A-C Circuit Analysis)	107
Sinusoidal Single-Phase	
Circuit Analysis	142
Non-Sinusoidal Waves	223
Coupled Circuits	273
Balanced Polyphase Circuits	325
Unbalanced Polyphase Circuits	373
Transmission Line Calculations	409
Electric Wave Filters	435
Symmetrical Components	489
	Effective Current and Voltage — Average Power  Phasor Algebra (As Applied to A-C Circuit Analysis)  Sinusoidal Single-Phase Circuit Analysis  Non-Sinusoidal Waves  Coupled Circuits  Balanced Polyphase Circuits  Unbalanced Polyphase Circuits  Transmission Line Calculations  Electric Wave Filters

a state of the latest

×	CONTENTS

	AIII	Calculation	s stastaco		52 <b>2</b>
	XIV	Transient C	Conditions		549
		Index			591
			- Casuo, company		
	141		regny, a remain again	1.5	
			man a mo serfled		
		400	they be than Demons	111	
1			nawal agent & me		
			to with Congression		
			Short Single-Pines		
142			Livery A. Ages	100	
100		*	"let "huseida" Vare	11	
				2112	
-			Counted Circuits	LIV	
325			b lancer Palyphon Crount	1111	
373		akin akin	ithholanded Colyphose Circ	1	
				10	
593		.5	frommusion Line Coloniano	1	
435			Estill evolvi a toeld	18	
088			Syn metrical Components	TIT	