CONTENTS

			PAGE
Pre	face		v
1.	INTRODUCTION		
	Reasons for Studying Fluctuations in Semi-conduc Classification of Various Sources of Noise	ctors .	1 2
2.	CHARACTERIZATION OF NOISINESS IN 'AND FOUR-TERMINAL NETWORKS	TWO-	
	Noise Characterization in Two-terminal Networks		3
	Noise Characterization in Four-terminal Networks		4
	Noise-measuring Equipment		6
	Noise Measurements		8
3.	MATHEMATICAL METHODS		
	Probability Distributions, Averages, Correlation		11
	Fourier Analysis of Fluctuating Quantities .		14
	Carson's Theorem		17
	The Langevin Equation for One Variable .		17
	The Langevin Equation for Several Variables		20
4.	GENERATION-RECOMBINATION NOISE IN CASE OF THERMAL EQUILIBRIUM	1 THE	
	Noise Caused by Resistance Fluctuations .		22
	Simple Treatment of the Problem: Older Theories		23
	Carrier Density Fluctuations		26
	Ambipolar Effects		31
	Processes Leading to a Series of Time Constants		37
	Equivalent Circuit Methods		39
	Comparison with Experiments		43
5.	FLICKER NOISE IN SEMI-CONDUCTOR MATERIAL		
	General Characteristics of Flicker Noise .		46
	Experiments Concerning the Nature of 1/f Noise		48
	Field Effect		50
	Application of the Surface Model to Flicker Noise		54
	Other Theories		60

CONTENTS

6.	NOISE IN PHOTO-CONDUCTORS			rno
	The Fundamental Noise Problem in Photo-co Sensitivity Limit of Photo-conductors: Noise I			65 7 0
	Discussion of Several Examples	-		73
	Discussion of Practical Photo-conductors .			77
7.	NOISE IN SEMI-CONDUCTOR RESISTO	RS		
	Linear Semi-conductor Resistance Devices .			83
	Non-linear Semi-conductor Resistors: Thermist	ors	·	84
8.	SHOT NOISE IN SEMI-CONDUCTOR DI	ODE	S	
	Introduction		20	86
	The Corpuscular Approach			89
	Modulation Effects	•	•	94
	The Collective Approach	•		96
	Experimental Verification of the Theory	•	•	106
	Noise in the Avalanche Region of a p-n	Junct	ion	100
	Characteristic	•	•	108
9.	SHOT NOISE IN JUNCTION TRANSISTO	ORS		
	The Low-frequency Corpuscular Approach	-		114
	General Corpuscular Approach in Transistors			119
	Modulation Effects	·		123
	The Collective Approach	•	2. •	124
	Experimental Verification of the Theory .	•	•	127
	•	•	•	14/
10.	FLICKER NOISE IN DIODES AND TRANS	ISTO	RS	
	General Characteristics of Flicker Noise .			137
	Flicker Noise in Junction Diodes			138
	Flicker Noise in Transistors			143
	There is a second of the secon	•	•	
11.	APPLICATIONS: MINIMUM NOISE CONSIDERATIONS			
	Noise in Semi-conductor Photocells			149
	Low-noise Transistor Circuits			151
	Diodes as Mixers and as Parametric Amplifiers	•	•	157
Ind	lex			165