Contents

1		Introduction By H Überall							
	-	by II. Oberan							
	Refe	erences		3					
2	Radar Polarimetry: Applications to Radar Systems								
	2.1	Polari	ization Behavior of Different Radar Objects	5 8					
	2.2	Some Implementation Aspects							
		2.2.1	Dual-Polarization Radar Configurations	9					
		2.2.2	Polarization Adaptation	10					
		2.2.3	Radar System Requirements	11					
	2.3	Optin	num Radar Receivers for Target Detection in the Clear.	12					
		2.3.1	Some Optimum Receiver Structures	14					
		2.3.2	Some Remarks on Performance Evaluation	16					
	2.4	Evalu	ation of Polarimetric Doppler Resolution						
		Throu	igh Cramér–Rao Bounds	19					
		2.4.1	Signal Modeling	20					
		2.4.2							
			and Maximum Likelihood Estimation	21					
	2.5								
		of Partially Polarized Disturbance							
		2.5.1	Improving Signal/Disturbance Ratio						
			Through Polarization Adaptation	29					
		2.5.2	Polarization Adaptation for Disturbance Cancellation.	33					
		2.5.3	Results on Adaptive Polarization Cancellation						
			of Partially Polarized Disturbance	38					
	2.6	Concl	lusions and Perspectives	44					
	References								
3	Fin	e Resol	ution of Radar Targets						
	By	By H. Überall (With 34 Figures)							
	3.1	The second							
		and the Singularity Expansion Method							
		3.1.1	Watson Transformation	48					
		3.1.2	Singularity Expansion Method: Conducting Targets	51					
		3.1.3	Dielectric Targets.	64					

	3.2	Surface Wave Resonances on Smooth Targets	
		of General Shape	1
		3.2.1 Finite Circular-Cylindrical Cavity	2
		3.2.2 Resonances of Conducting Finite Cylinders	
		and Prolate Spheroids	7
		3.2.3 Phase Matching of Surface Waves	
		on Conducting Spheroids	35
	3.3	Application to Inverse Scattering)1
		3.3.1 Radar Spectroscopy)3
		3.3.2 The Inverse Scattering Problem	
		for a Coated Conducting Sphere	8
		3.3.3 Transient Observation of Resonance Frequencies 10	13
	3.4	Conclusions	8
	Refe	rences	18
4		nified Theory of Multidimensional Electromagnetic Vector	
		rse Scattering Within the Kirchhoff or Born Approximation	
	-	K.J. Langenberg, M. Brandfaß, P. Fellinger, T. Gurke,	
		T. Kreutter (With 17 Figures)	3
	4.1	Integral Representations for Electromagnetic Scattering	
		by Perfectly Conducting and Dielectric Scatterers	4
	4.2	Linearization in Terms of the Born	0
		or Kirchhoff Approximation for Plane Wave Incidence 11	8
	4.3	Dyadic Backpropagation in Terms of the Generalized Vector	0
	4.4	Holographic Fields	9
	4.4	Solution of the Linearized Electric Vector Porter-Bojarski	1
		Equation in the Frequency Diversity Mode	
		The second s	1
		4.4.2 Perfectly Conducting Scatterer Within the Kirchhoff Approximation	0
	4.5	Numerical Simulations	
	4.5 4.6	Conclusions	
	4.0 4.A	Some Properties of Singular Functions	
	4.B	Computation of the Generalized Vector Holographic Field	ro
	ч. D	in Terms of the Scattering Amplitude	19
	Refe	erences	
	Reit		
5	The	Measurement of Radar Cross Section	
		E.K. Walton (With 23 Figures)	52
	5.1	Measurement Theory	52
		5.1.1 Calibration of Measurements	;3
	5.2	The OSU Measurement Range 15	
		5.2.1 Compact Range Architecture	55
		5.2.2 Reflector Types and Trade Offs 15	55
		5.2.3 The Feed 15	57

	5.2.4	Test Target Support	158				
	5.2.5	Instrumentation.	160				
	5.2.6	Range Sensitivity	161				
5.3	Perfor		162				
	5.3.1	Direction of Arrival	164				
	5.3.2	Near Field Imaging	172				
	5.3.3	Conclusions	174				
5.4	Analy	sis of RCS Measurements.	175				
	5.4.1	Frequency Domain Techniques	175				
	5.4.2	Aspect Angle Domain Processing	185				
Refe	rences		192				
Subject Index							