TABLE OF CONTENTS

1.	THE	CLUSTER PROBLEM AND PRELIMINARY IDEAS 1											
	1.1	Basic Notions and Definitions 1											
	1.2	The Cluster Problem											
	1.3	Distance Functions											
	1.4	Measures of Similarity 5											
	1.5	Distance and Similarity Between Clusters 11											
	1.6	Cluster Methods Based on Euclidean Distance 19											
	1.7	An Algorithm for Hierarchical Clustering 24											
	1.8	Other Aspects of the Cluster Problem											
2.	CLUS	TERING BY COMPLETE ENUMERATION											
	2.1	Introduction											
	2.2	The Number of Partitions of n Objects into m Non-empty Subsets											
	2.3	Recursive Relation for Stirling's Numbers of the Second Kind											
	2.4	Computational Aspects of Complete Enumeration 41											
3.	MATHEMATICAL PROGRAMMING AND CLUSTER ANALYSIS 4												
	3.1	Application of Dynamic Programming to the Cluster Problem											
	3.2	Jensen's Dynamic Programming Model											
	3.3	Integer Programming Applications to Cluster Analysis											
4.	SIMI	LARITY MATRIX REPRESENTATIONS											
	4.1	Dendograms											
	4.2	Comparison of Dendograms or Their Similarity Matrices											
	4.3	Basic Definitions											

	4.4	Trees	з.	•	•••	•	•	••	•	•	٠	• •	•	•	•	•	٠	•	•	•	•	82
	4.5	Loca.	l Op	era	tio	ns	on	Tr	ees	5	•	• •	•	•	•	•	•	•		•	•	88
5.	CLUS	TERINO	З ВА	SED	ON	DI	SNS	ITY	ES	STI	MA	TIC	N	•	•	•	•	•	•	•	•	91
	5.1	Mode	Ana	lys	is	•	•	••	•	•	•	• •	•	•	•	٠	•	•	•	•	•	91
	5.2	Proba	abil	ity	De	nsi	ity	Fu	nct	io	n	Est	im	at:	io	n	•	•	•	•	•	93
	5.3	Clust	teri	ng	Bas	ed	on	Dep	nsi	ty	Е	sti	ma	ti	on	•	•	•	•	•	•	96
	5.4	Remai	rks	•	• •	•	•	••	•	•	•	•••	•	•	•	•	•	•	•	•	•	99
6.	APPL	ICATI	ONS	•				••	•	•	•	• •	•	•	•	•	•	•	•	•		100
	6.1	Appl:	Lcat	ion	to	Re	emo	te :	Ser	nsi	ng	Da	ta	•	•	•	•	•	•	•	•	100
	6.2	Appl: Fig	icat sher	ion 's	of Iri	De s I	ens Dat	ity a .	Es •	ti: •	ma [.]	tio	n !	rec	hn •	iq •	ue	t.	•	•	•	103
7.	HIST	ORICAL	CO	MME	NTS	•	•		•	•	• •	• •	٠	•	•	•	•	•	•	•	•	104
	REFE	RENCES	5.	•	• •				•	•		•		•	•	•	•		•	•		110