CONTENTS

I.	Bayesian Regression and Prior Distributions	. 7
	1. Introduction	7
	2. Estimation and design as a Bayesian decision problem	13
	2.1 Specification of the decision problem	13
	2.2 The classical and the Bayesian approach	16
	3. Choice of a prior distribution	20
	4. Conjugate prior distributions	28
	4.1 Definition of a conjugate prior	28
	4.2 Properties of conjugate priors	31
	4.3 Conjugate prior and posterior distributions for normal errors	35
	4.4 Some remarks on the specification of a normal- gamma- prior	38
II.	Bayesian Estimation	44
	5. Bayes estimation of the regression parameter	. 44
	5.1 Bayes estimation with quadratic loss	44
	5.2 A nonstandard example	49
	5.3 The conjugate Bayes estimator	54
	5.4 Risk improvement over the LSE	58
	5.5 Effects of misspecification of the prior moments	64
	6. Optimality and robustness of the Bayes estimator	68
	6.1 Robustness of Bayes optimality	68
	6.2 Minimax-Bayes optimality	75
	 Bayesian interpretation of estimators using non-Bayesian prior knowledge 	80
	7.1 Linear restrictions	80
	7.2 Use of prior estimates	83
	7.3 Quadratic constraints, ridge and shrunken estimators	85
	8. Bayes estimation in case of prior ignorance	89
	9. Further problems	95
	9.1 Empirical Bayes estimation	95
	9.2 Bayes estimation with hierarchical priors	100
	9.3 Further literature	103

III. Bayesian Experimental Design	105	
10. The design problem for the linear Bayes estimator	105	
10.1 The exact design problem	105	
10.2 The Bayesian information matrix	107	
10.3 The extended design problem	109	
11. Characterization of optimal designs	115	
11.1 Properties of the design functionals	115	
11.2 Admissibility and complete classes of designs	121	
11.3 Equivalence theorems	124	
12. Construction of optimal continuous designs	131	
12.1 Construction of Ap-optimal designs	131	
12.2 L _R -optimal and Bayesian designs	141	
12.3 D_B^- and E_B^- optimality of designs	144	
12.4 Optimal designs for multiple linear regression	149	
12.5 Iteration procedures for the construction of approximately optimal designs	160	
13. Construction of exact optimal designs	170	
13.1 Rounding of discrete optimal designs	170	
13.2 Exact optimal designs for multiple linear regression	174	
13.3 Iteration procedures	185	
14. Further problems	191	
14.1 Bayesian one-point designs	191	
14.2 Cost-optimal designs	194	
14.3 Further literature and research	196	
Appendix	198	
References		
	206	
List of Symbols	216	