

# Contents

## **Trend-free Repeated Measurement Designs 1**

*K. Afsarinejad*

1	Introduction . . . . .	1
2	Notation and definitions . . . . .	2
3	Model and conditions for trend-free RMDS . . . . .	3
4	Main results . . . . .	4

## **Minimax Optimal Designs for Nonparametric Regression — A Further Optimality Property of the Uniform Distribution 13**

*S. Biedermann, H. Dette*

1	Introduction . . . . .	13
2	Asymptotic representation of the integrated mean squared error of a nonparametric regression estimator . . . . .	15
3	Optimal designs minimizing the maximum integrated mean squared error . . . . .	16

## **Optimization of Monitoring Networks for Estimation of the Semivariance Function 21**

*E.P.J. Boer, E.M.T. Hendrix, D.A.M.K. Rasch*

1	Introduction . . . . .	21
2	Theory . . . . .	22
3	Case study . . . . .	24
4	Results . . . . .	25
5	Discussion and conclusions . . . . .	27

## **A-optimal Chemical Balance Weighing Designs with Diagonal Covariance Matrix of Errors 29**

*B. Ceranka, K. Katulska*

1	Introduction . . . . .	29
2	A lower bound for $\text{tr}(\mathbf{X}'\mathbf{G}^{-1}\mathbf{X})^{-1}$ . . . . .	30
3	A-optimal weighing designs . . . . .	33

<b>Replications with Gröbner Bases</b>	<b>37</b>
<i>A.M. Cohen, A. Di Bucchianico, E. Riccomagno</i>	
1 Introduction . . . . .	37
2 Basic setup . . . . .	38
3 Identifiability of linear models . . . . .	39
4 A polynomial algebraic representation of $\mathcal{L}(D)$ . . . . .	40
5 Examples . . . . .	42
<b>Extracting Information from the Variance Function: Optimal Design</b>	<b>45</b>
<i>D. Downing, V.V. Fedorov, S. Leonov</i>	
1 Model, MLE and iterated estimators . . . . .	45
2 Optimal design . . . . .	48
3 Examples . . . . .	50
<b>Model Validity Range in Multicentre Clinical Trials</b>	<b>53</b>
<i>V. Dragalin, V.V. Fedorov</i>	
1 Combined response to treatment: definitions and models . .	53
2 Estimators and model validity range . . . . .	54
3 Conclusions . . . . .	61
<b>Two Models of Nonadaptive Group Testing for Designing Screening Experiments</b>	<b>63</b>
<i>A.G. D'yachkov, A.J. Macula, D.C. Torney, P.A. Vilenkin</i>	
1 Description of the models . . . . .	63
2 Superimposed codes . . . . .	66
3 Concatenated construction for superimposed codes . . . . .	70
4 Examples . . . . .	73
<b>Optimal Designs for a Continuation-ratio Model</b>	<b>77</b>
<i>S.K. Fan, K. Chaloner</i>	
1 Introduction . . . . .	77
2 Locally D-optimal designs . . . . .	80
3 Bayesian D-optimal designs . . . . .	81
4 c-optimal designs . . . . .	84
5 Conclusion . . . . .	85

## **Bayesian Interpolation Schemes for Monitoring Systems 87**

*K. Felsenstein*

1	Introduction . . . . .	87
2	Estimation of monitoring functions . . . . .	89
3	Interpolation . . . . .	91
4	Applications . . . . .	94

## **Optimality of the Wald SPRT for Processes with Continuous Time Parameter 97**

*L.I. Galtchouk*

1	Introduction . . . . .	97
2	Optimality of the Wald sequential test in the Bayesian setting	98
3	Main result . . . . .	105
4	Examples and an auxiliary proposition . . . . .	107

## **Efficient Paired Comparison Designs for Utility Elicitation 111**

*H. Großmann, U. Graßhoff, H. Holling, R. Schwabe*

1	Introduction . . . . .	111
2	Reduction to the canonical form . . . . .	113
3	The best two-point design . . . . .	114
4	Efficient three-point designs . . . . .	114
5	Discussion . . . . .	116

## **Optimal Design for the Testing of Anti-malarial Drugs 119**

*L.M. Haines, G.P.Y. Clarke, E. Gouws, W.F. Rosenberger*

1	Introduction . . . . .	119
2	Preliminaries . . . . .	120
3	Optimal designs . . . . .	121
4	Conclusions . . . . .	125

## **Optimal Adaptive Designs for Delayed Response Models: Exponential Case 127**

*J. Hardwick, R. Oehmke, Q. F. Stout*

1	Introduction . . . . .	127
2	Models with exponential delay . . . . .	128
3	A randomized play-the-winner rule . . . . .	130
4	Results of comparisons . . . . .	130
5	Conclusions . . . . .	133

<b>Non-<math>D</math>-optimality of the Simplex Centroid Design for Regression Models Homogeneous of Degree <math>p</math></b>	<b>135</b>
<i>R.-D. Hilgers</i>	
1 Introduction . . . . .	135
2 Non $D$ -optimality . . . . .	136
3 Comments . . . . .	139
<b>New Upper Bounds for Maximum-Entropy Sampling</b>	<b>143</b>
<i>A. Hoffman, J. Lee, J. Williams</i>	
1 Introduction . . . . .	143
2 Partition bounds . . . . .	145
3 Spectral partition bounds . . . . .	148
<b>Residuals</b>	<b>155</b>
<i>H. Läuter</i>	
1 Introduction . . . . .	155
2 Joint distribution of $Y_1$ and $\text{med}Y$ . . . . .	156
3 Distribution of $Y_1 - \text{med}Y$ and $Y_1 - \bar{Y}$ . . . . .	159
4 Consequences and recommendations . . . . .	161
<b>Asymptotically Optimal Sequential Discrimination between Markov Chains</b>	<b>163</b>
<i>M.B. Malyutov, I.I. Tsitovich</i>	
1 Introduction and setting of the problem . . . . .	163
2 Results . . . . .	165
3 Asymptotically optimal strategy . . . . .	166
4 Proof . . . . .	167
<b>Optimum Experimental Designs for a Modified Inverse Linear Model</b>	<b>171</b>
<i>I. Martínez, I. Ortiz, C. Rodríguez</i>	
1 Introduction . . . . .	171
2 $D$ -optimal designs . . . . .	173
3 Other optimal designs . . . . .	177
4 Some numerical examples . . . . .	178

## Permutation Tests for Effects in Unbalanced Repeated Measures Factorial Designs 183

*D. Mazzaro, F. Pesarin, L. Salmaso*

1	Introduction . . . . .	183
2	Synchronized permutations in $2^2$ balanced and unbalanced designs . . . . .	184
3	Permutation tests for balanced and unbalanced repeated measures designs . . . . .	188
4	Simulation study . . . . .	189
5	Conclusions . . . . .	190

## The Influence of the Design on the Breakdown Point of $\ell_1$ -type M-estimators 193

*I. Mizera, Ch.H. Müller*

1	Introduction . . . . .	193
2	Computation of $\mathcal{M}(X)$ . . . . .	194
3	$\mathcal{M}(X)$ as a design criterion . . . . .	197
4	Applications for leverage/influence diagnostics . . . . .	198

## Analytical Properties of Locally $D$ -optimal Designs for Rational Models 201

*V.B. Melas*

1	Introduction . . . . .	201
2	Outline of the problem . . . . .	202
3	Preliminary results . . . . .	203
4	Definition and properties of optimal design-functions . . . . .	205
5	Examples . . . . .	207
6	Concluding remarks . . . . .	209

## Understanding Aliasing Using Gröbner Bases 211

*G. Pistone, E. Riccomagno, H.P. Wynn*

1	The Gröbner basis method . . . . .	211
2	A theorem on aliasing . . . . .	212
3	Further examples . . . . .	214
4	Conclusion . . . . .	215

## Average $D$ -optimum Design for Randomly Varying Experimental Conditions 217

*L. Pronzato*

1	Introduction . . . . .	217
2	Expected determinants . . . . .	219
3	Examples . . . . .	221

## **Constrained Bayesian Optimal Designs for Phase I Clinical Trials: Continuous Dose Space** **225**

*W.F. Rosenberger, L.M. Haines, I. Perevozskaya*

1	Motivation . . . . .	225
2	Constrained Bayesian $D$ -optimal designs . . . . .	226
3	Numerical methods . . . . .	228
4	Results . . . . .	229
5	Conclusions . . . . .	230

## **Trend-Robust and Budget Constrained Optimum Designs** **235**

*L. Tack, M. Vandebroek*

1	Introduction . . . . .	235
2	Time trends in design of experiments . . . . .	236
3	Cost-efficient design of experiments . . . . .	237
4	Trend-resistant design of experiments under budget constraints . . . . .	237
5	The cryogenic flow meter experiment . . . . .	239
6	Conclusion . . . . .	242

## **Minimax Designs for Logistic Regression in a Compact Interval** **243**

*B. Torsney, J. López-Fidalgo*

1	Introduction . . . . .	243
2	Some basic results . . . . .	245
3	MV-optimal designs . . . . .	246
4	Conditions of optimality for MV-criterion . . . . .	248
5	Asymmetric design intervals . . . . .	249

## **Sensor Motion Planning with Design Criteria in Output Space** **251**

*D. Uciński*

1	Introduction . . . . .	251
2	Sensor location problem . . . . .	252
3	Optimal-control formulation . . . . .	254
4	Minimization algorithm . . . . .	255
5	Numerical example . . . . .	256
6	Conclusion . . . . .	257

<b>Quality Improvement of Signal-Dependent Systems</b>	<b>259</b>
<i>I.N. Vuchkov, L.N. Boyadjieva</i>	
1 Introduction . . . . .	259
2 Mean and variance models of the performance characteristics of signal-dependent systems . . . . .	260
3 Variance models for performance characteristics depending on time . . . . .	262
4 Example: quality improvement of a process with an observable and uncontrollable factor . . . . .	264
 <b>Recursive Algorithm for Digital Diffusion Networks and Applications to Image Processing</b>	 <b>267</b>
<i>G. Yin, P.A. Kelly, M.H. Dowell</i>	
1 Introduction . . . . .	267
2 Properties of the digital diffusion networks . . . . .	268
3 Application to image estimation . . . . .	270
4 Further remarks . . . . .	274
 <b>List of Authors</b>	 <b>277</b>
 <b>List of Referees</b>	 <b>283</b>

MODA 6 - Advances in Model-Oriented Design and Analysis

Proceedings of the 6th International Workshop on Model-Oriented Design and Analysis held in

Puchberg/Schneeberg, Austria, June 25–29, 2001

Atkinson, A.; Hackl, P.; Müller, W.G. (Eds.)

2001, XVI, 283 p. 12 illus., Softcover

ISBN: 978-3-7908-1400-2

A product of Physica-Verlag Heidelberg