

# Contents

<b>Trend-free Repeated Measurement Designs</b>	<b>1</b>
<i>K. Afsarnejad</i>	
1    Introduction . . . . .	1
2    Notation and definitions . . . . .	2
3    Model and conditions for trend-free RMDS . . . . .	3
4    Main results . . . . .	4
<b>Minimax Optimal Designs for Nonparametric Regression</b>	
<b>— A Further Optimality Property of the Uniform</b>	
<b>Distribution</b> <span style="float: right;">13</span>	
<i>S. Biedermann, H. Dette</i>	
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
<b>Optimization of Monitoring Networks for Estimation of the Semivariance Function</b>	<span style="float: right;">21</span>
<i>E.P.J. Boer, E.M.T. Hendrix, D.A.M.K. Rasch</i>	
1    Introduction . . . . .	21
2    Theory . . . . .	22
3    Case study . . . . .	24
4    Results . . . . .	25
5    Discussion and conclusions . . . . .	27
<b>A-optimal Chemical Balance Weighing Designs with Diagonal Covariance Matrix of Errors</b>	<span style="float: right;">29</span>
<i>B. Ceranka, K. Katulska</i>	
1    Introduction . . . . .	29
2    A lower bound for $tr(\mathbf{X}'\mathbf{G}^{-1}\mathbf{X})^{-1}$ . . . . .	30
3    A-optimal weighing designs . . . . .	33

<b>Replications with Gröbner Bases</b>	<b>37</b>
<i>A.M. Cohen, A. Di Buccianico, 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

<b>Bayesian Interpolation Schemes for Monitoring Systems</b>	<b>87</b>
<i>K. Felsenstein</i>	
1 Introduction . . . . .	87
2 Estimation of monitoring functions . . . . .	89
3 Interpolation . . . . .	91
4 Applications . . . . .	94
<b>Optimality of the Wald SPRT for Processes with Continuous Time Parameter</b>	<b>97</b>
<i>L.I. Galtchouk</i>	
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
<b>Efficient Paired Comparison Designs for Utility Elicitation</b>	<b>111</b>
<i>H. Großmann, U. Graßhoff, H. Holling, R. Schwabe</i>	
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
<b>Optimal Design for the Testing of Anti-malarial Drugs</b>	<b>119</b>
<i>L.M. Haines, G.P.Y. Clarke, E. Gouws, W.F. Rosenberger</i>	
1 Introduction . . . . .	119
2 Preliminaries . . . . .	120
3 Optimal designs . . . . .	121
4 Conclusions . . . . .	125
<b>Optimal Adaptive Designs for Delayed Response Models: Exponential Case</b>	<b>127</b>
<i>J. Hardwick, R. Oehmke, Q. F. Stout</i>	
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

<b>Permutation Tests for Effects in Unbalanced Repeated Measures Factorial Designs</b>	<b>183</b>
<i>D. Mazzaro, F. Pesarin, L. Salmaso</i>	
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
<b>The Influence of the Design on the Breakdown Point of <math>\ell_1</math>-type M-estimators</b>	<b>193</b>
<i>I. Mizera, Ch.H. Müller</i>	
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
<b>Analytical Properties of Locally D-optimal Designs for Rational Models</b>	<b>201</b>
<i>V.B. Melas</i>	
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
<b>Understanding Aliasing Using Gröbner Bases</b>	<b>211</b>
<i>G. Pistone, E. Riccomagno, H.P. Wynn</i>	
1 The Gröbner basis method . . . . .	211
2 A theorem on aliasing . . . . .	212
3 Further examples . . . . .	214
4 Conclusion . . . . .	215
<b>Average D-optimum Design for Randomly Varying Experimental Conditions</b>	<b>217</b>
<i>L. Pronzato</i>	
1 Introduction . . . . .	217
2 Expected determinants . . . . .	219
3 Examples . . . . .	221

<b>Constrained Bayesian Optimal Designs for Phase I Clinical Trials: Continuous Dose Space</b>	<b>225</b>
<i>W.F. Rosenberger, L.M. Haines, I. Perevozskaya</i>	
1 Motivation . . . . .	225
2 Constrained Bayesian $D$ -optimal designs . . . . .	226
3 Numerical methods . . . . .	228
4 Results . . . . .	229
5 Conclusions . . . . .	230
 <b>Trend-Robust and Budget Constrained Optimum Designs</b>	<b>235</b>
<i>L. Tack, M. Vandebroek</i>	
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
 <b>Minimax Designs for Logistic Regression in a Compact Interval</b>	<b>243</b>
<i>B. Torsney, J. López-Fidalgo</i>	
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
 <b>Sensor Motion Planning with Design Criteria in Output Space</b>	<b>251</b>
<i>D. Uciński</i>	
1 Introduction . . . . .	251
2 Sensor location problem . . . . .	252
3 Optimal-control formulation . . . . .	254
4 Minimization algorithm . . . . .	255
5 Numerical example . . . . .	256
6 Conclusion . . . . .	257

<i>Contents</i>	xv
<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 observ- able 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>