

# CONTENTS

## Volume 2

### SYSTEMS IDENTIFICATION IN CHINA (Session 50(I))

Dynamic Systems Identification Research in China - A Brief Survey <i>L. Bao</i>	841
Hypothesis Testing in Data Analysis of System Identification <i>Z. D. Yuan</i>	845
A New Approach to Bilinear Systems Identification and its Applications <i>Z.-Hu. Jiang, W.-S. Jiang</i>	851
Canonical Structure and Identification Algorithm of Multivariable Systems <i>G.-Z. Lu, X.-F. Wang, Z.-M. Wang, E.-C. Liu</i>	857
Identification Problem of Linear Multi-Variable Systems <i>S.-Y. Zhang, J.-Y. Zhao</i>	863
Identification of a Class of Special Nonlinear Systems Using Clamp Operator <i>B.-N. Li, Y.-J. Zhong</i>	869

### IDENTIFIABILITY AND OBSERVABILITY (Session 51)

Parameter Identifiability Analysis by Modal Methods <i>J. P. Norton</i>	875
Identifiability of Time-Continuous MIMO Closed Loop Systems <i>G. Bretthauer</i>	881
Identifiability Testing for State-Space Models <i>Y. Lecourtier, E. Walter, P. Bertrand</i>	887
The Conditions for Identifiability of Infinite Dimensional Linear Systems <i>Y. L. Chen</i>	893
Minimizing Unobservability for Linear Systems with Unmeasurable Periodic Disturbances <i>G. Alengrin, L. Passeron</i>	897

### REALIZATION AND ESTIMATION THEORY (Session 52)

Practical Tests with Different Approximate Realizations Based on the Singular Value Decomposition of the Hankel Matrix <i>A. A. H. Damen, A. K. Hajdasinski</i>	903
Approximate Realization of Discrete Time Stochastic Processes <i>E. Canuto, G. Menga</i>	909
Martingale Convergence Analysis of Output Error Identification Algorithms <i>I. D. Landau</i>	915
Martingale Theory in Bayesian Least Squares Estimation <i>J. Sternby, H. Rootzén</i>	921

A Computationally Efficient GLR Algorithm for Detecting and Estimating State Jumps in Linear Systems <i>H. L. Stalford</i>	927
Accuracy Aspects of Parameter Estimation in Linear Dynamical Systems <i>G. A. Elkobrosy, J. Hrušák</i>	933
INVERSE PROBLEMS IN GEOPHYSICS (Session 53(I))	
Inverse Problems for Reflection Seismograms <i>E. A. Robinson</i>	939
Extraction of Seismic Profiles for One-Dimensional Nonhomogeneous Media Using the Impulse Response Model <i>W. J. Vetter</i>	945
Review of Some Exact Methods for the Solution of the One-Dimensional Inverse Problems <i>F. Santosa</i>	951
Difference Methods for Solving One-Dimensional Inverse Problems <i>K. P. Bube, R. Burridge</i>	957
Maximum-Likelihood as Applied to Seismic Inversion Problems <i>J. M. Mendel</i>	963
Some Results on the Three-Dimensional Geophysical Inverse Problem <i>M. T. Silvia</i>	967
SELF-TUNING PREDICTORS AND FILTERS (Session 54)	
Typical Application Possibilities for Self-Tuning Predictive Control <i>R. M. C. De Keyser, A. R. van Cauwenberghe</i>	975
Self-Tuning Predictor for a Class of Distributed Parameter Systems <i>M. Vajta jr, L. Keviczky</i>	981
Predictor-Based Self-Tuning Control <i>V. Peterka</i>	985
Simple Self-Tuning Multistep Predictors <i>R. M. C. De Keyser, A. R. van Cauwenberghe</i>	991
Multivariate Self-Tuning Filter and Smoother <i>Z. L. Deng</i>	997
Fixed Gain Controller and Filter Design for Stochastic Systems with Application to Aircraft <i>Y. Baram, D. Eidelman</i>	1003
IDENTIFICATION OF METABOLIC SYSTEMS IN PHYSIOLOGY AND CLINICAL SCIENCE: STATE OF THE ART, PROBLEMS, APPROACHES AND PERSPECTIVES (Session 55(I))	
Integrated Methodology for Model Formulation, Identification and Validation of Metabolic and Endocrine Systems <i>E. R. Carson, C. Cobelli, L. Finkelstein</i>	1009
The Identification of a Mathematical Model for the Interpretation of Clinical Measures of Thyroid Disease <i>E. R. Carson, P. R. Edwards, L. Finkelstein</i>	1015
Simple vs Comprehensive Models of Glucose/Insulin Dynamic Interactions in the Whole Organism. Role of Identification and Validation <i>C. Cobelli, A. Mari, K. Thomaseth, R. N. Bergman</i>	1021
Comprehensive Dynamics of Distribution and Metabolism of Thyroid Hormones in Blood and Tissue Pools Using Sequentially Optimized Experiment Designs and <i>a priori</i> Inequality Analyses <i>J. J. DiStefano, III</i>	1027

Pharmacokinetics: The Role of Compartmental Models <i>K. R. Godfrey</i>	1033
IDENTIFICATION METHODS (Session 60)	
Identification of Linear Time-Invariant Multivariable Systems <i>C.-T. Chen</i>	1039
The Application of Block Pulse Function in Identification of Parameters of Nonlinear Time Varying Systems <i>Wang Shienyu</i>	1045
Identification of Linear Time Varying Differential Systems Amid Modal Disturbances <i>A. E. Pearson</i>	1051
Identification of Deterministic Linear System with Variable Time-Delay <i>C.-B. Feng</i>	1057
Robust Real-Time Identification of Linear Multivariable Systems <i>B. Kovačević, S. Stanković</i>	1061
On-Line Identification and Steady-State Optimization of Non-Stationary Dynamic Objects <i>I. N. Vuchkov, V. K. Tsochev</i>	1067
INSTRUMENTAL VARIABLES AND OTHER IDENTIFICATION METHODS (Session 61)	
Identification of Multivariable Systems Using Instrumental Variable Methods <i>P. Stoica, T. Söderström</i>	1073
Structure Determination and Parameter Estimation of Multivariable Systems by Instrumental Variables <i>M. S. Ahmed</i>	1079
An Instrumental Variable Method for Stochastic Subsystem Identification <i>C. E. Kim, J. T. Cain</i>	1085
Strong Consistency in System Identification Under Correlated Noise <i>Chen Han Fu</i>	1091
State Predictor for Discrete-Time Linear System <i>C. E. de Souza</i>	1097
Parameter Identification in a Model Reference Adaptive System <i>O. A. Sebakhly, A. I. A. Salama</i>	1103
MAXIMUM-LIKELIHOOD AND RELATED TOPICS (Session 62)	
A Survey of Some Recent Developments in System Parameter Identification <i>W. E. Larimore</i>	1107
Maximum Likelihood Estimators for the Transition Probabilities of a Reversible Markov Chain <i>E. Arnnicht, H. Wenzelburger</i>	1113
Local Maximum Likelihood State Estimation for Discrete Systems with State Dependent Noise <i>A. W. Warren</i>	1117
Variable Forgetting Factors in Parameter Estimation <i>M. B. Zarrop</i>	1123
On Input Signal Synthesis for Parameter Estimation with Output Power Constraints <i>G. A. Elkobrosy</i>	1127

APPLICATION OF SYSTEM IDENTIFICATION TO AERONAUTICS  
(Session 63(I))

Implementation of Aircraft Parameter Identification <i>P. Mereaue</i>	1133
Formulation of a Practical Algorithm for Parameter Estimation with Process and Measurement Noise <i>R. E. Maine, K. W. Iliff</i>	1139
Frequency Domain Parameter Estimation Based on Sampling and Packing Theorems <i>W. Wells, K. Rattan, S. Banda</i>	1145
Flight Test Results of Five Input Signals for Aircraft Parameter Identification <i>E. Plaetschke, J. A. Mulder, J. H. Breeman</i>	1149
A Mathematical Model for Efficient Estimation of Aircraft Motions <i>R. E. Bach, Jr</i>	1155
On the Determination of Airplane Model Structure from Flight Data <i>V. Klein, J. G. Batterson, P. L. Smith</i>	1163
SELF-TUNING REGULATORS I (Session 64)	
Arbitrary Linear Output Feedback Self-Tuners <i>K. Warwick, J. H. Westcott</i>	1169
Extended Self-Tuning - Practical Aspects <i>S. P. Sanoff, P. E. Wellstead</i>	1175
Simple Self-Tuning Control <i>H. C. Lammers, H. B. Verbruggen</i>	1181
A New Self-Tuning Controller for Plants Disturbed by Correlated Noise <i>J. Hrušák, M. A. Magdy, M. Šimandl</i>	1187
A Self-Tuning Control Algorithm for Systems with Unknown Time Delay <i>K. Y. Wong, M. M. Bayoumi</i>	1193
On Self Tuning Regulators and the Least Squares Procedure <i>E. Fogel</i>	1199
NEUROMUSCULAR SYSTEM IDENTIFICATION (Session 65)	
Autoregressive Moving Average (ARMA) Models of Neuromuscular System <i>G. C. Agarwal, S. M. Goodarzi, W. D. O'Neill, G. L. Gottlieb</i>	1205
Undamped Natural Frequency Estimation of Tremor and Reflex Response for Parkinson Patients <i>P. Löhmberg, H. B. K. Boom, H. M. Greebe</i>	1211
Identification of Transient EEG-Responses <i>H.-E. Schurk</i>	1217
Recognition of Traditional Chinese Medicine Sphygmograms Using the System Identification Approach <i>Z.-F. Zhang, R.-J. Ma, Y.-J. Feng</i>	1223
A Model for Use in Automated Control of Muscle Relaxation During Surgical Procedures <i>H. S. Bradlow, L. B. Rametti</i>	1229
COMPUTATIONAL METHODS IN IDENTIFICATION (Session 70)	
On the Minimax Approach for Dynamic System Identification <i>M. L. S. Teles, P. B. L. Castrucci</i>	1235

Multivariable Identification Using Pseudo-Canonical Forms <i>G. O. Corrêa, K. Glover</i>	1241
Identification by the Stochastic Variant of the Steepest Descent Method <i>F. Z. Unton</i>	1247
Intermediate Domain System Identification Using Walsh Transforms <i>B. Dwoletzky</i>	1253
Parallel Processing Algorithms for System Parameter Identification <i>R. H. Travassos</i>	1259
On-Line Eigenvector Algorithms for the Identification of Dynamic Systems <i>Ü. Kotta</i>	1265
DISTRIBUTED PARAMETER AND OTHER SYSTEMS IDENTIFICATION (Session 71)	
Identification of Noisy Distributed Parameter Systems Using Optimal Stochastic Approximation Procedure <i>S. A. F. Bassiouny, B. M. Abuelnasr, M. N. El-Derini</i>	1271
A Method for Parameter Estimation of a Class of Nonlinear Distributed Systems under Noisy Observations <i>Y. Sunahara, Sh. Aihara, F. Kojima</i>	1277
Identification of Distributed-Parameter Vibrating Systems <i>L. Meirovitch, H. Baruh</i>	1283
The Application of Large-Scale State Estimation to Vibrating Structures <i>D. L. Lager, S. G. Azevedo, J. V. Candy</i>	1289
A Method of Residual Averaging (Averaged Stochastic Approximation ASA) for Process Identification <i>Sh. E. Shteinberg</i>	1295
On-Line Identification and Fault Detection of Industrial Processes <i>A. Rault, D. Jaume, M. Vergé</i>	1299
NONLINEAR ESTIMATION (Session 72)	
Wiener Functionals for an N-Level Uniformly Distributed Discrete Random Process <i>R. B. Melton, J. P. Kroeker</i>	1307
A Bias Identification and State Estimation Methodology for Nonlinear Systems <i>A. K. Caglayan, R. E. Lancraft</i>	1313
Volterra's Model of Nonlinear Imaging Systems <i>M. Monsion</i>	1319
Structurally Stable Design of Nonlinear Least Squares Experiments <i>A. van den Bos</i>	1323
Identification of Continuous Time Systems - An Application of Ljung's Corrected Extended Kalman Filter <i>D. T. Gavel, S. G. Azevedo</i>	1329
An Investigation of Adjustment Gain Design in Stationary and Nonstationary LMS Adaptive Algorithms <i>T. C. Hsia, S. Sugimoto</i>	1335
PARAMETER ESTIMATION IN AERONAUTICS AND ASTRONAUTICS (Session 73)	
Galileo Spacecraft Inertial Sensors In-Flight Calibration Design <i>M. H. Jahanshahi, J. Y. Lai</i>	1341

Identifying the Aerothermodynamic Environment of the Space Shuttle Orbiter, <i>Columbia</i> <i>D. R. Audley, J. K. Hodge</i>	1347
VLF Data for Aircraft Navigation Based on an Extended Kalman Filter Design <i>B. W. Leach, C. A. Maskell</i>	1353
Adaptive Flutter Suppression as a Complement to LQG Based Aircraft Control <i>J. B. Moore, A. F. Hotz, D. Gangsaas</i>	1359
Adaptive Autopilot with Wave Filter <i>S. Saelid, N. A. Jenssen</i>	1365
Aircraft Parameter Estimation with Non-Rational Turbulence Model <i>F. C. Tung</i>	1371
SELF-TUNING REGULATORS II (Session 74)	
Design of Self-Adjusting Controllers <i>K. A. Fegley, G. I. Balvinsson, H. Chen</i>	1377
Self Tuning Controller Design Incorporating Frequency Response Criteria <i>F. M. Hughes, A. Y. Allidina</i>	1383
Multivariable State-Feedback Self-Tuning Controllers <i>L. S. Shieh, C. T. Wang, Y. T. Tsay</i>	1389
Direct Methods for Self-Tuning PID Regulators <i>Cs. Bányász, L. Keviczky</i>	1395
On Self-Tuning Control of a Class of Nonlinear Scalar Processes <i>K. Korpela, H. N. Koivo</i>	1401
A Two-Level Multivariable Self Tuning Regulator <i>M. A. El-Bagoury, M. M. Bayoumi</i>	1407
CARDIOPULMONARY SYSTEM IDENTIFICATION AND CONTROL (Session 75)	
Parameter Identification and Adaptive Control for Blood Pressure <i>B. K. Walker, T.-L. Chia, K. S. Stern, P. G. Katona</i>	1413
On-Line Estimation of Lung Parameters Using Multiple Gases <i>D. M. Wiberg, J. W. Bellville</i>	1419
Modelling of Respiratory Patterns in the Neonatal Period <i>S. Sjöberg</i>	1425
A New Deconvolution Technique and its Application to the Study of Vascular Systems <i>D. Commenges</i>	1431
A Model-Based Adaptive Blood Pressure Controller <i>J. B. Slate, L. C. Sheppard</i>	1437
Modeling and Identification of Compartmental Systems for Biomedical Applications <i>Z. Si-lan, H. Shao-xiong, H. Tuan-hua, H. Bing-xian, C. Guan-ying</i>	1443
PATTERN RECOGNITION (Session 80(I))	
Attributed Grammars for Image Analysis <i>K. S. Fu</i>	1449
Cooperative Processes in Image Analysis <i>L. S. Davis</i>	1455
Two-Dimensional Discrete Space-Varying Systems: Identification, Balancing and Model Reduction <i>F. Clara, L. M. Silverman</i>	1461

Multiple Models for Nonstationary Image Estimation <i>R. Mediavilla, H. Kaufman, M. Tekalp, J. W. Woods</i>	1467
ECONOMIC SYSTEM IDENTIFICATION (Session 81)	
Estimation of Structural Change and Adaptive Behavior of a Commodity Industry Subject to Random Energy Price Fluctuations <i>W. D. O'Neill</i>	1473
Demands Identification Problems in Inventory Control Systems <i>V. A. Lototsky, A. S. Mandel</i>	1479
Identification of Adaptive Forecasting Models for Raw Material Prices and Industrial Fluctuation Indices <i>R. A. Müller</i>	1483
PARTITIONING ESTIMATION ALGORITHMS AND APPLICATIONS I (Session 82(I))	
Performance Analysis of Partitioned Adaptive Estimators <i>R. M. Hawkes</i>	1489
Multi-Partitioning Linear Estimation Algorithms: Discrete Time Systems <i>D. G. Lainiotis, D. Andrianti II</i>	1495
Economic Modelling and Forecasting via Adaptive Estimation <i>D. G. Lainiotis, L. S. Segal</i>	1501
REDUCED-ORDER MODELS FOR LARGE-SCALE SYSTEMS (Session 83(I))	
Reduced-Order Modelling by Aggregation for Control and Suboptimality Evaluation <i>G. Duc, G. Michalesco, J.-M. Siret, P. Bertrand</i>	1507
Suboptimal Control of Large Scale Systems by Chained Aggregation <i>S. V. Rao</i>	1513
Critical Review of Methods for Deriving Stable Reduced-Order Models <i>Y. Shamash</i>	1519
The Order of an Equivalent for Large Scale System <i>Z. Elrazaz, N. K. Sinha</i>	1525
IMPLEMENTATION OF STATE ESTIMATION TECHNIQUES IN REAL TIME CONTROL OF POWER SYSTEMS (Session 84(I))	
The Role of State Estimation in Power System Operation <i>T. E. Dy Liacco</i>	1531
Fast State Estimation - Results of a Systematic Investigation of Decoupled Weighted Least Squares Methods <i>L. Radu, A. M. Sasson</i>	1535
The State Estimation Function Used in the Swedish State Power Board <i>L. Joelsson, L. Wiklund, S.-L. Wirkander</i>	1541
Daily Security Analysis on the EDF Power Transmission System Based on a Hierarchized State Estimation Procedure <i>A. Merlin, F. Broussolle, P. Clavel</i>	1545
State Estimation in Belgian Control Centers: Past Experience and Future Trends <i>J. P. Waha, J. Dantinne, P. DePauw, P. Vandeloise, Y. Hella, T. Van Cutsem, M. Ribbens-Pavella</i>	1553
WATER RESOURCES (Session 85)	
Identification of Water Deficiency and Photosynthesis in Short-Term Plant Growth under Random Variation of the Environment <i>Y. Hashimoto, T. Morimoto, S. Funada</i>	1559

Parameter Identification of Compartmental Models - Case of Hydrologic Rainfall-Runoff Models <i>S. Sorooshian</i>	1565
Optimal Estimation of the Average Areal Rainfall Over a Basin and Optimal Selection of Rain-Gauge Locations <i>B. Lorent, G. Bastin, C. Duqué, M. Gevers</i>	1571
Two-Level Suboptimal Filtering with Application to Water Resources <i>B. Minárik</i>	1577
Contemporary Stochastic Approach to Water Resources Systems: The ARMP and Feature Prediction Models <i>O. Ibidapo-Obe</i>	1583
SIGNAL IDENTIFICATION AND ALGORITHMS (Session 90)	
Identification of a Large Vector AR Model and its Application to Image Processing <i>S. Sugimoto, A. K. Jain</i>	1589
Experimental Model Building of Timevarying Systems by Linear Optimal Filtering <i>L. Hewinkel, H. Rake</i>	1595
On-Line Identification in Speech Differential Encoding System <i>N. K. Sinha, Z. H. A. Abu-El-Magd</i>	1601
Fast Algorithms for Block Toeplitz Systems <i>N. Kalouptsidis, D. Manolakis, G. Carayannis</i>	1605
MICROCOMPUTERS AND APPLICATIONS (Session 91)	
A Novel Series-Parallel Identifier for Microcomputer Process Control <i>C. P. Neuman, C. S. Baradello</i>	1611
Dedicated Microprocessors for Real-Time Identification of Multivariable Systems <i>H. El-Sherief, M. A. Maud</i>	1617
A Microcomputer System for Determining the Dynamic Equivalent of a Synchronous Generator <i>K. Y. Lee, S. M. Sombar</i>	1623
On the Control of Mechanical Manipulators <i>C. S. G. Lee, M. J. Chung, J. L. Turney, T. N. Mudge</i>	1629
Application of a Non-Linear Filter to Multivariable Parameter Adaptive Control in a Distributed Microcomputer System <i>A. Halme, J. Selkänaho</i>	1635
Implementation of Multivariable Parameter-Adaptive Control Algorithms Using Modern Microprocessor Techniques <i>F. Radke</i>	1641
PARTITIONING ESTIMATION ALGORITHMS AND APPLICATIONS II (Session 92(I))	
Identification of an Ecological Model by Partitioning Filter Plant Growth in Arid Regions <i>J. Aguilar-Martin, S. Rambal</i>	1647
Partitioning Estimation and Identification of European Satellite GEOS <i>G. Campion, P. Y. Willems, J. C. Samin</i>	1653
Bearings-Only Target Tracking Via Partitioning Estimation Algorithms <i>V. Petridis</i>	1659



Modeling and Identification of Aircraft Pilot Models Via Partitioning Estimation Algorithms <i>D. Andrisani, C. F. Gau, S. M. Bourne, D. G. Lainiotis</i>	1665
POWER SYSTEMS IDENTIFICATION (Session 94)	
Modelling and Simulation Used for Control-Action Improvement of a Hydro-Power Plant; A Case Study <i>K. H. Fasol</i>	1671
Multivariable Identification and Parameters Estimation of Electric Power Plants <i>H. Dang Van Mien, I. Rousseau</i>	1677
A Two-Level State Estimator in Electric Power Systems with Bad Data Analysis <i>Th. Van Cutsem, M. Ribbens-Pavella</i>	1683
Approach to the Adaptive Control of a Solar Plant <i>L. Fortuna, A. Gallo, M. La Cava</i>	1689
Applications to Nuclear Power Plants of Nonlinear Identification and Realization Techniques <i>P. Bourdon, H. Dang Van Mien, M. Fliess, D. Normand-Cyrot</i>	1695
Microprocessor Based Parameter and State Estimator and its Application to Load Forecasting of Interconnected Power Systems <i>H. El-Sherief, M. A. Maud</i>	1701
Author Index	1707