5th IFAC Symposium on Power Plants and Power Systems Control 2006

Kananaskis, Alberta, Canada 25-28 June 2006

ISBN: 978-1-61839-621-1

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2006) by Elsevier Limited All rights reserved.

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact the publisher, Elsevier Limited at the address below.

Elsevier Limited The Boulevard, Langford Lane Kidlington OX5 1GB, United Kingdom

Phone: +44 (0)1865 844640 Fax: +44 (0)1865 843912

Email: eurobkinfo@elsevier.com

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400 Fax: 845-758-2634 Email: curran@proceedings.com Web: www.proceedings.com

Table of Contents

A Novel Concept for Stabilization of AC/DC Network with UPFC R.K. Pandey	1
Limitation Control Procedures Required for Power Plants and Power Systems Possibility for Reducing Future Blackouts E. Welfonder and M. Kurth	7
SISO Extended Predictive Control – Formulation and Robust Analysis M. Abu-Ayyad and R. Dubay	17
Robust Decentralized H_{∞} Controller Design for Power Systems: A Matrix Inequality Approach using Parameter Continuation Method G.K. Befekadu and I. Erlich	23
Self-Tuning PI Controller I. Boiko	29
Development of an Extended Predictive Controller for a Speed Control System M. Abu-Ayyad and R. Dubay	35
Power System Stabilizer Design for Multimachine Power System using Population-Based Incremental Learning K.A. Folly	41
Development of Educational Web-Based Simulator for the Electricity Spot Market in Korea J.W. Lee, K.M. Yang, Y.W. Jeong, J.B. Park and J.R. Shin	47
A Cooperative Power Trading System based on Satisfaction Space Technology	53
K. Matsumoto, T. Maruo, and N. Mori	
Influence of Wind Energy on the Power Station Park and the Grid H. Weber, T. Hamacher, and T. Haase	59
An Approach to Optimal Dispatch of Bilateral Electricity Contracts Regarding Voltage Stability B. Mozafari, A.M. Ranjbar, A. Mozafari and T. Amraee	65
Identification of Synchronous Generators using "4SID" Identification Method and Neural Networks M. Karrari, W. Rosehart, O.P. Malik and A.H. Givehchi	71
Parameter Estimation of Power System Oscillations based on Phasor Measure- ments T. Hashiguchi, Y. Ota, H. Ukai, Y. Mitani, O. Saeki and M. Hojo	77
Identification of Electric Parameters of Synchronous Generator using Input- Output Data Set S.A. Saied, S.M. Bathaee, M. Karrari, W. Rosehart and O.P. Malik	83

Estimation of Moisture Content in Coal in Coal Mills P.F. Odgaard and B. Mataji	89
Simplified Fuel Cell System Model Identification S. Caux, W. Hankache, D. Hissel and M. Fadel	95
An Affine Geometrical Approach to Power Systems Problems E.D. Crainic and A.I. Petroianu	101
Discrete-Time Model Reference Adaptive Regulation of Nodal Voltage Ampli- tude in Power Systems G. Fusco and M. Russo	107
Determination of Transmission Transfer Capability with Security and Voltage Stability D. Hur and H.J. Lee	113
Voltage Stability Assessment and Enhancement of the Thailand Power System A. Sode-Yome, N. Mithulananthan and K.W. Lee	119
Design, Implementation and Testing of an Artificial Neural Network Based Admittance Relay G. Chawla, M.S. Sachdev and G. Ramakrishna	125
A New Numerical Algorithm for Fault Location Estimation using Two- Terminal Synchronized Voltage and Current Phasors C.J. Lee, Z. Radojevic, H.H. Kim, J.B. Park and J.R. Shin	131
Complete Fault Analysis for Long Transmission Line using Synchronized Sampling N. Zhang and M. Kezunovic	137
Study on the Establishment of Dynamic Performance Test Environment for the Digital Protective Relay using RTDS B.T. Jang, C.Y. Choe and G. Jung	143
Hybrid HVDC Converters and their Impact on Power System Dynamic Per- formance B. Qahraman, A.M. Gole and I.T. Fernando	147
Predicting Transient Instability of Power Systems based on Hybrid System Reachability Analysis Y. Susuki, H. Ebina and T. Hikihara	153
Stability Analysis of an Islanded Generator P. Lilje and A. Petroianu	159
Primary Control System and Stability Analysis of a Hydropower Plant M.R.G. Zoby and J.I. Yanagihara	165
Observer-Based Coal Mill Control using Oxygen Measurements P. Andersen, J.D. Bendtsen, T.S. Pedersen, J.H. Mortensen and R.J. Nielsen	171

Fault Detection in Coal Mills used in Power Plants P.F. Odgaard and B. Mataji	177
Control Performace of Large Scale Steam Power Plants and Improvements T. Weissbach, M. Kurth, E. Welfonder, D. Haake and R. Gudat	183
Intelligent Start-Up Schedule Optimization System for a Thermal Power Plant M. Shirakawa, K. Kawai, M. Arakawa and H. Nakayama	189
A Fault Diagnosis and Operation Advising Cooperative Expert System Based on Multi-Agent Technology W. Zhao, X. Bai, J. Ding, Z. Fang and Z. Li	195
Model Based Fleet Optimisation and Master Control of a Power Production System C. Joergensen, J.H. Mortensen, T. Moelbak and E.O. Nielsen	201
Reliability Enhancement Scheme for IEC61850 based Substation Automation System S.I. Lim, D.H. Park, S.J. Lee, S.S. Han and M.S. Choi	207
Modeling Voltage Regulation in Object-Oriented Analysis of Distribution Sys- tems Including Dispersed Generation G.M. Casolino, A. Losi and M. Russo	213
Service Restoration Considering Load Balancing in Distribution S.Y. Choi, J.S. Cha, C.D. Yoon and M.C. Shin	219
Real-Time Volt/VAR Control in a Distribution System using Multi-Stage Method J.Y. Park and J.K. Park	225
Development of the Automatic Recognition System for Distribution Facility Map B.J. Yi, J.I. Song, J.H. Shin, J.I. Lee and S.K. Cho	231
Sensor Dynamics Compensator for Temperature Measurement in Combustion Chambers of Utility Boiler and Incinerators I. Boiko, and V. Mkrttchian	237
Sub-Space Principal Component Analysis for Power Plant Monitoring L. Pan, D. Flynn and M. Cregan	243
Combustion Plant Monitoring and Control using Infrared and Video Cameras S. Zipser, A. Gommlich, J. Matthes and H.B. Keller	249
Enhancement of Electric Motor Reliability through Condition Monitoring K.E. Holbert, K. Lin and G.G. Karady	255
Performance of H_{∞} -PSSs as Affected by the Parameters of the Bilinear Transform K.A. Folly and K. Mocwane	261

Dual Input Quasi-Optimal PSS for Generating Unit with Static Excitation 267 System

Z. Lubosny

Experimental Studies on a Proto-Type Power System using an Adaptive PSS 273 G. Ramakrishna and O.P. Malik

Extended Phase Compensation Design of Power System Stabilizer for Bisotoun 279 Power Plant

G. Zafarabadi, M. Parniani, M. Rasouli and P. Ansarimehr

Robust Control Design of PSS in Wide Area Power System Considering Infor-285 mation Reliability H. Ukai, G. Toyosaki, Y. Nakachi and S.C. Verma

Analytical Investigation of the Effect of Generator Modelling on Electrome-291 chanical Load Damping K. Kaberere, A. Petroianu and K. Folly

Comparison of Methods for Oscillation Detection – Case Study on a Coal-Fired 297 Power Plant P.F. Odgaard and K. Trangbaek

Low Load Model of a Once-Through Boiler with Recirculation 303 K. Trangbaek

Semigroup based Neural Network Architecture for Extrapolation of Mass Unbalance for Rotating Machines in Power Plants B.H. Kim, J.P. Velas and K.Y. Lee

MGP: A Tool for Wide Range Temperature Modeling	315
A.F. Kuri-Morales and L.V. Seisdedos	

Simulation as a Tool for Process Design and Disturbance Analysis in Industrial 321 Power Plants Y. Majanne

Operator Guidance Simulator, A New Power Plant Training Tool Concept 327 U. Tomschi, H. Jackisch and R. Newald

Application of Affine Transformations to Real-Time Power System EMS Func- 333 tions

E.D. Crainic and A.I. Petroianu

Autonomous Power Networks Based Power System339A. Jokic and P.P.J. van den Bosch

Importance of the Selfregulating Effect within Power Systems345M. Kurth and E. Welfonder345

Optimal Power System Management via Mixed Integer Dynamic Programming 353 H.G. Kwatny, E. Mensah D. Niebur and C. Teolis

Static Characteristics Analysis of Power Systems Through a Hermitian Approach J. Zhou and Y. Ohsawa	359
Economic Dispatch Algorithm by λ -P Tables Reflecting Actual Fuel Cost Curves K.I. Min, J.G. Lee, S.J. Kim, H.S. Hong and Y.H. Moon	365
Power System Maximum Loadability with Generation Constraints C.E.M Fernandes, R.S. Salgado and L.V. Barboza	371
Optimal Allocation of Static VAR Compensators using Modal Analysis, Simulated Annealing and TABU Search S. Ebrahimi, M.M. Farsangi, H. Nezamabadi-Pour and K.Y. Lee	377
Distributed MPC Strategies for Automatic Generation Control A.N. Venkat, I.A. Hiskens, J.B. Rawlings and S.J. Wright	383
Modelling and Optimization of a Micro Combined Heat and Power Plant D. Faille, C. Mondon and L. Henckes	389
The Way of District Heating Output Control by Means of Hydrothermal Power Systems - Three Modifications J. Balate, P. Jenik, B. Chramcov and P. Navratil	395
Weighted Fouling Model for Power Plant Condenser Monitoring M. Cregan and D. Flynn	401
A Multi-Agent System-Based Reference Governor for Multiobjective Power Plant Operation J.S. Heo and K.Y. Lee	407
Adaptive Governor Control and Load Shedding Scheme for an Incinerator Plant Y.D. Lee, C.S. Chen and C.T. Hsu	413
Additional papers:	
Verification of Hybrid Real Time HVDC Simulator in Cheju-Haenam HVDC System""" B.M. Yang, C.K. Kim, G.J. Jung, Y.D. Choi, J.K. Park, J.B. Choo	""63;
Current Features of DCS Systems for Power Plants """	'""'646
A Distributed Control Algorithm for AGC in Hydrothermal Power Plants """""	""'652
Torsional Stress of Turbine-Generator in Power System with an HVDC """"""""""""""""""""""""""""""""""""	""'658