

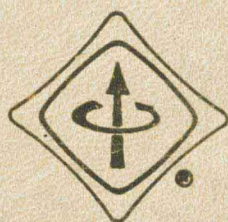
ICPST '94

Proceedings of the International Conference on

Power System Technology

October 18-21, 1994, Beijing, China

Volume 2



IEEE



INTERNATIONAL ACADEMIC PUBLISHERS

ICPST '94

Proceedings of the International Conference on

Power System Technology

October 18-21, 1994, Beijing, China

Volume 2

Edited by

Electric Power Research Institute, China

Sponsored by

Institute of Electrical & Electronics Engineers (IEEE)

Power Engineering Society (PES)

Chinese Society for Electrical Engineering (CSEE)

with the Cooperation of

Electric Power Research Institute, China

Tsinghua University, Beijing, China

江苏工业学院图书馆
藏书章



IEEE



INTERNATIONAL ACADEMIC PUBLISHERS

(京)新登字 141 号

图书在版编目(CIP)数据

电力系统技术：国际电力系统技术会议论文集：英文 /
电力科学研究院编. — 北京：万国学术出版社, 1994. 10
ISBN 7-80003-328-7

I.电… II.电… III.电力系统-进展-国际会议-文集
-英文 IV.TM7-53

中国版本图书馆 CIP 数据核字 (94) 第 09691 号

Published and Distributed by
International Academic Publishers
137 Chaonei Dajie, Beijing 100010
The People's Republic of China

Copyright © 1994 by International Academic Publishers

The book has been photographically reproduced from the best available copy. The papers were not refereed but were reviewed for their technical contents. Editing was restricted to matters of format, general organization and retyping. The editors assume no responsibility for the accuracy, completeness or usefulness of the information disclosed in this volume. Unauthorized use might infringe on privately owned patents of publication right. Please contact the individual authors for permission to reprint or otherwise use information from their papers.

First edition 1994

**Proceedings of the International Conference on Power System Technology
Volume 2**

国际电力系统技术会议论文集 第 2 卷

ISBN 7-80003-328-7 / TK • 19

Printed by the Printing House of China Building Industry Press

CONTENT

Volume 1

Session K1: Plenary Session

Date & Time: Tuesday, Oct. 18, 1994 , AM

Energy Systems Beyond Fossil Age

Thomas H. Lee 1

Flexible AC Transmission System (FACTS) and Potential State-of-the-Art Opportunities and Limitations

Narain G. Hingorani 23

Co-Ordination of Hydro Power and Thermal Power

Ingvald Haga 24

Learning from One Another in Electric Power

Lionel O. Barthold 32

Implementation Issues of Control Center Networking

T.E. Dy-Liacco 36

The Three Gorges Power System and Interconnection of Power Pools of the Whole Country

Zhou Xiaoxin 37

Session T1: Studies on Transmission System of the Three Gorges Project

Date & Time: Tuesday, Oct. 18, 1994 , PM

Technical Proposals of Interconnection Scheme and Transmission Upgrading for the Three Gorges Hydropower Project

He Dayu, Ding Gongyang 45

A Study on Power Transmission Scheme from Three Gorges Power Station to East-China Power System

Chen Shousun, Ni Yixin, Zhang Zhonghua, Diao Qinhua, Wang Yanchun, Zhang Baolin, Ye Zhaoji, Feng Guimin, Zhang Qiping, Chang Jianping 49

Alternatives Studied for the Three Gorges to East-China Transmission System

Zhou Xianlin, Zheng Yingfen 53

The Study on Structure of Central China Power Network in the Long Range Plan

Chen Jian, Li Jisheng 58

The Future Short-Circuit Current Level and Control of Central China Electric Power System	
<i>Fu Xiafei, Zhang Zhenling, Chen Jian, Li Jisheng</i>	61
Research on Lightning Surge Protection in Three Gorges Hydro-Electric Power Station	
<i>Zhang Weipo</i>	65
Stochastic Long-Term Scheduling of Multireservoirs System Using Multi-Level Stochastic Approximation	
<i>Zhou Junren, Zhang Daoyuan</i>	69
A Strategic Research on Primary Energy for the Medium- and Long-Term Developing Planning of Central China Power Network (CCPN)	
<i>Huo Ji'an, Yang Mingzhou, Huang Yong</i>	74
The Possible System of Energy Transmission from Three Gorges Hydro Power Station	
<i>G.N. Alexandrov</i>	78

Session G1: Power System Analysis
Date & Time: Tuesday, Oct. 18, 1994 , PM

Integrated Power System Analysis Environment	
<i>S. Kuloor, G.S. Hope, O.P. Malik</i>	82
Application of Neural Computing to the State Estimation Problem	
<i>R. Zivanovic, A. Petroianu</i>	87
Parallel Solution of Power System Problems	
<i>J.Q. Wu, A. Bose</i>	93
Projective Piecewise Solution of Unsymmetrical Short Circuit in Large Power Systems	
<i>Qiu Changtao, Wang Jinli, Nie Hongzhan</i>	99
A Fuzzy Set Approach for Control Curtailment and Constraint Enforcement in an Optimal Power Flow	
<i>Xiaohong Guan, W.-H Edwin Liu</i>	104
A New Algorithm for Composite Power System Reliability Evaluation	
<i>Guo Yongji, Fu Ganglin, Dai Youjie</i>	109
A Physical Laboratory for Dynamic and Static Testing of Protective Relay Systems	
<i>Wei-Jen Lee, Mo-Shing Chen, Li Ren-Jun, Ma Shao-Yan</i>	111
Energy Based Reliability Indices in Generating System Evaluation	
<i>S. Fockens, A.J.M. van Wijk, W.C. Turkenburg, C. Singh</i>	116
Investigation of Possibilistic-Probabilistic Observation Consistency Problem on Real Power Flow Analysis	
<i>J.M. Ling, C.E. Lin</i>	123
A Canonical Method of Network Manipulation for Unsymmetrical Changes in Power System Network	
<i>Zhang Boming, Yang Jian</i>	131

Session G6: Power System Harmonics
Date & Time: Tuesday, Oct. 18, 1994 , PM

Harmonics at the Utility-Industrial Interface: A Real-World Example	
<i>Robert L. Almonte, A. Wayne Ashley</i>	137
Zero-Sequence Harmonic Currents Generated by HVDC Converters	
<i>K. Sadek, N. Christl, P. Luetzelberger</i>	146
System Studies and Design of AC-Harmonic Filters for HVDC Converters	
<i>N. Christl, P. Lützelberger, H. Huang, K. Sadek</i>	151
Active Filtering of DC-Side Harmonics of HVDC Systems with Passive Elements	
<i>M. Pereira, K. Sadek, N. Christl, P. Luetzelberger, H. Huang</i>	156
A Novel Voltage Source Active Filter for AC Harmonic Compensation	
<i>Xu Xia, Wang Huiren, Shen Longda, Zang Zangkui, Wang Qihuai</i>	161
Optimal Selection of Parameters in Electric Power Filters	
<i>Cheng Haozhong, Sasaki Hiroshi, Yorino Naoto, Liao Peihong, Chen Zhangchao</i>	168
A Novel Model for Harmonic Analysis on DC Side of HVDC Systems	
<i>Liu Zehong</i>	173
DC Harmonic Calculation and DC Filter Study for Tianshengqiao—Guangdong HVDC Project	
<i>Jiao Baoli, Liu Zehong</i>	178
Mathematical Models and Harmonic Analysis of Arc Furnace Electric Systems	
<i>Liu Xiaohu, Cheng Shaogeng</i>	183

Session H4: HV Switchgear and Overhead Line
(Tower, Conductor)
Date & Time: Tuesday, Oct. 18, 1994 , PM

Application Aspects of Gas-Insulated Switchgear in Power Plant Environment	
<i>K.V. Menon, S.M. Koo, Pan Wenning</i>	188
Evaluation of and Life Cycle Cost Calculation for Generator Circuit-Breakers	
<i>D. Braun</i>	193
Feature Extraction of Circuit-Breaker Mechanical Vibration	
<i>J.Q. Lang, A.D. Stokes</i>	198
On-Line Monitoring of the Leakage Current in HV Oil-Minimum Breaker	
<i>Lu Fangcheng, Cai Lijun, Chen Zhiye, Xu Yuqin, Liu Guangqi</i>	203
Conductor Selection for EHV Transmission Line	
<i>Gao Xuan</i>	207
Overhead Transmission Lines Design — Some Mechanical Aspects	
<i>J.L. Lilien, Jianwei Wang, O. Chabart, P. Pirotte</i>	212
Multi-Objective Optimization for the Conductor Configuration of Compact Lines	
<i>Huang Weigang, Wang Jing</i>	217
Development and Application of a New Type Galloping Damper for Overhead Transmission Lines	
<i>Lu Mingliang, You Chuanyong</i>	221

**Session O1: Power System Economic Dispatching
and Scheduling**

Date & Time: Tuesday, Oct. 18, 1994 , PM

"Economic Despatch" of Power Shortages for Minimization of Economic Impact of Generation Deficits	
<i>Tanveer Azhar</i>	225
A Modified Algorithm for Economic Dispatch Computation	
<i>Kwang Y. Lee, Xiaomin Bai, Young-Moon Park, Hak-Su Kwon</i>	230
An Integrated Approach to Economic and Security Generation Dispatch Including Dynamic Security	
<i>T.S. Chung, K.L. Lo</i>	237
Research for the Best Load Factor Control of the CCEPN	
<i>Liao Zaoyun, Ding Zhongzhi</i>	242
Risk Constrained Dynamic Optimal Dispatch in Power System	
<i>Han Xueshan, Liu Zhuo</i>	246
Real Time Security Constrained Dispatch	
<i>Zhu Wendong, Hao Yuguo, Liu Guangyi, Yu Erkeng, Zhang Jianfeng, Wang Haizhong</i> ...	251
An Expert System for Multi-Area Unit Commitment with Monthly Energy Constraints	
<i>Zhu Ruiyun, Fan Mingtian</i>	257
Decentralized Automatic Generation Control Considering Generation Rate Constraints Based on Observer Theory	
<i>Goro Fujita, Shin-ichi Kawakami, Goro Shirai</i>	261

**Session C1: Power Plant Control and
Power System Stability**

Date & Time: Tuesday, Oct. 18, 1994 , PM

Generalized Predictive Steam Temperature Control for Power Plant Systems	
<i>B.W. Hogg, Siqing Lu, Ni Weidou</i>	266
An Adaptive Predictive Control for Reheating Temperature Process of 200 MW Peak-Regulating Once-Through Boiler	
<i>Lu Huiming, Wang Pingyang, Yang Zhiyuan, Shen Zijun</i>	271
Control of Vertical Spindle Mills in Coal Fired Power Plants	
<i>G.Q. Fan, N.W. Rees</i>	276
Object-Oriented Power Plant and Control System Modeling	
<i>Siqing Lu, B.W. Hogg, Ni Weidou</i>	281
Improving Power System Stability by Selecting Parameters of Excitation Control Systems Using a Genetic Algorithm	
<i>L.L. Lai, F. Ndeh-Che, K.H. Chu</i>	286
Fuzzy Data Base Theory and Technology for Online Security Analysis in Power Systems	
<i>Teng Fusheng, Liu Jie</i>	291
Transfer Function Model Identification for Electric Power System Loads	
<i>Bai Jianhua, Shen Shande, Gao Jingde</i>	296

Session A2: Power System Dynamic Characteristics
Date & Time: Tuesday, Oct. 18, 1994 , PM

The Application of the Basic Form of Park's Equations to the Dynamic Analysis of Electric Power System	
<i>Huang Jiayu, Sun Dechang</i>	299
Geodesic Approaching in Non-Riemannian Space and Its Application to Adaptive Non-Linear Control Design in Power Systems	
<i>Qiu Changtao, Nie Hongzhan</i>	304
An Effective Approach for Coherency Identification of Generators by Individual Machine Energy Functions	
<i>Song Zhidong, Gao Jingde, Shen Shande</i>	309
Dynamic Characteristic Investigations for Self-Excited Induction/Reluctance Generator Systems	
<i>Cheng-Tsung Liu, Wen-Lin Chang</i>	313
Artificial Neural Networks for Power System Dynamic Modeling	
<i>Shen Shande, Chen Houlian, Zhu Shouzheng, Jiao Lianwei</i>	318
PC-Based Multi-Input Multimedia System and Its Application to Power System Monitoring and Simulation	
<i>Kuang-Jun Chang, Niu Ding</i>	322
Digital Power Line Carrier, a Novel Concept for Power System Communications	
<i>K. Morf</i>	325
Neural Network Based Turbine Fast Valving to Aid System Stability	
<i>Liu Yutian, Du Zhengchun, Xia Daozhi</i>	332

Session P1: Power System Expansion and Generation Planning
Date & Time: Wednesday, Oct. 19, 1994 , AM

Generation and Transmission Expansion Planning Criteria for the Brazilian Electric Power System	
<i>A.V. Filho, P.A. Pegado, M. Szechtman</i>	337
An Interactive Method for Solving the Power System Expansion Problem Taking into Account Reliability	
<i>V.V. Ivanov, Yu.N. Kucherov, O.M. Kucheroa</i>	342
Power System Expansion Planning: By Methods of Number Representation Hopfield Model and Simulated Annealing Technique	
<i>Huang Liangbao, Shan Yuanda</i>	346
Reliability and Economic Optimization of Long-Term Operation Planning for Hydrothermal Power System	
<i>Chen Xueqing, Wang Haoyu, Chen Gang, Xiang Niande</i>	351
A Fuzzy Multiobjective Programming Model for Generation Expansion Planning	
<i>Fu Chengjun, Chen Jinan</i>	356

Planning and Building of Nuclear Power Station in Provincial Power System	
<i>Wang Daguang, Wang Ling, Zhang Ronglin, Lin Yin</i>	360
 Session G2: <u>Power System Computation</u>	
Date & Time: <u>Wednesday, Oct. 19, 1994 , AM</u>	
Unsymmetrical Three-Phase Fast Decoupled Load Flow Study by Parallel Processors	
<i>Chu Wenjie, Chen Heng</i>	365
Fast Decoupled Optimal Power Flow	
<i>Wang Xianrong, Gao Zhongwen, Liu Zhuo, Yu Erkeng, Liu Guangyi, Zhang Jing</i>	370
Implementation of Load Flow Program on Vector Computers	
<i>H.S. Huang, C.N. Lu</i>	375
Parallel Implementation of Monte Carlo Simulation Methods for Power System Reliability Evaluation — Some Problems and Solutions	
<i>N. Gubbala, C. Singh</i>	380
Adaptive Control and Improved Sampling in the Simultaneous Decomposition Simulation Method for Interconnected Power System Reliability Analysis	
<i>C. Singh, J. Feng</i>	385
A Probabilistic Study on Transmission Losses of Power Systems	
<i>Mu Gang, Wang Weiguo, Zhao Can, Wang Zhiming</i>	390
Analysis of Powers and Line Losses of Unbalanced Three Phase Three Wire Circuits with Sinusoidal Voltage and Currents	
<i>S.Y. Lee, C.J. Wu</i>	395
A Study of Short-Circuit on Transmission Line for Large-Scale Complex Power Systems in Piece-Wise Method	
<i>Lü Feipeng, Mi Linshu, Liu Fangning, Jiang Kexun</i>	400
Twofold-Decoupled Three Phase Harmonic Load Flow	
<i>Zhang Xiaoping, Chen Heng</i>	404
 Session U1: <u>Distribution System and Demand-Side Problem</u>	
Date & Time: <u>Wednesday, Oct. 19, 1994 , AM</u>	
The Use of Short-Term Feeder Load Forecasts for Distribution Network Operation	
<i>M. Kärenlampi, P. Verho, P. Järventausta, J. Partanen</i>	409
Current-Based Power Flow Solutions for Distribution Systems	
<i>Jen-Hao Teng, Whei-Min Lin</i>	414
Aspects of Unbalance Conditions in a Radial and Meshed Network	
<i>E. Johnson, A. Petroianu</i>	419
A Method to Evaluate the Reliability Cost and Reliability Worth of the Power Distribution System	
<i>Y.L. Mok, T.S. Chung</i>	425
A New Criterion for Evaluating Cost and Benefits on Demand Side Management	
<i>Zeng Ming, Yves Smeers, Zhu Chengzhang</i>	430

The Research for Prediction Approach to Residential & Commercial Sectors and DSM Evaluation Framework	
<i>Zeng Ming, Yves Smeers, Zhu Chengzhang</i>	434
Software Package for Electrical Distribution Networks	
<i>V.I. Idelchik, Yu.G. Kononov, V.Kh. Kouzhev, B.V. Idelchik, V.Ed. Vorotnitsky, Eu.A. Zhaltikov, I.F. Zakharov, A.A. Aphanasieff</i>	439
The Introduction of Probabilistic Methodologies in the Electric System of the Largest Urban Area of South America	
<i>T. Santini, E.T. Nahas, L.R. de Azevedo</i>	444
 Session D1: HVDC Equipments and Control	
Date & Time: <u>Wednesday, Oct. 19, 1994 , AM</u>	
A Novel Approach to UHVDC 800 kV Station and Equipment Design	
<i>G. Asplund, U. Åström, A. Canelhas, G. Elbatal, O. Heyman, E. Purra</i>	448
Proven Control Concept for HVDC Long Distance Transmission System	
<i>Chr. Schmid, G. Wild, D.A. Marshall</i>	453
Advanced Control Strategy for a HVDC Scheme in Parallel Operation with AC Systems	
<i>A.E. Hammad, Kadry Sadek</i>	459
Measurement and Evaluation of Equivalent Disturbing Currents (E_{DC}) on an HVDC Transmission Line	
<i>Ingo Ziemke, Thomas Schlegel, Kadry Sadek, Asok Mukherjee, Yan Huimin, Chai Zhaozong</i>	465
Service Experience at Gezhouba and Nanqiao ± 500 kV HVDC Converter Stations and Effect of Applying RTV Coating	
<i>Sun Zhaoying</i>	471
Mitigating Harmonic Instabilities in HVDC System with Energy Recovery Filter	
<i>Xiao Jiang, A.M. Gole</i>	474
HVDC Control with On-Line Learning Based Neural Network	
<i>A. Daneshpooy, A.M. Gole</i>	479
Bipolar HVDC Controller Based on Multi-Processor	
<i>Gao Liying, Jiang Shufei, Zhang Baolin, Yang Jian, Chen Shousun, Ni Yixin, Zhang Wang, Tu Dongmin, Cheng Jie, Zhang Ailing, Guo Hongguang, Li Tianfeng</i>	484
SF₆ Return Transfer Breakers in HVDC Systems	
<i>N. Christl, U. Habedank, H. Kölsch, K. Sadek, H.-H. Schramm</i>	488

**Session O2: Power System Control Center
and Control System, EMS**

Date & Time: Wednesday, Oct. 19, 1994 , AM

Development of an Intelligent Support System at Local Power Control Center in Korea	
<i>H.J. Lee, Y.M. Park, S.H. Hyun, J.B. Chu, Y.B. Yaon</i>	494
An Open and Distributed Energy Management System	
<i>Zhang Boming, Deng Youman, Sun Hongbin, Tian Tian, Lin G.W., Cai X.</i>	498

A Flexible and Open Graphic System for Commercial EMS	
<i>Tian Tian, Zhang Boming</i>	503
Extension Tactics to an Existing Energy Management System	
<i>Ma Zhiqiang, Chen Jiatong</i>	507
National Grid Company's Experience in the Implementation of an AC Power System State Estimator and Security Analysis Application	
<i>J.G.P. Scott, H.P. Johnson, R. Shafie'pour</i>	510
The Power Load Management System	
<i>Li Yufa, Huang Zhengzhu, Wang Jinqing</i>	515
Power System Control for the Future	
<i>W.R. Lachs, D. Sutanto</i>	517
Application of Speech Recognition Teehnology in Control Center	
<i>Zhou Xiaolin, Liu Debin, Liu Lin, Dong Changling, Gou Lu</i>	522
Design and Development of Advanced Application Software in Energy Management System	
<i>Yu Erkeng, Liu Guangyi, Zhou Jingyang, Xu Qian, Zhu Wendong</i>	524
 Session V1: <u>Excitation and VAR Control</u>	
Date & Time: <u>Wednesday, Oct. 19, 1994 , AM</u>	
Application of Genetic Algorithms to Optimal Voltage Control of Power Systems	
<i>Q.H. Wu, J.T. Ma</i>	529
Voltage and Reactive Power Expert Control in the Chilean Power System	
<i>Demián Talavera, Marco Arróspide, Aldo Cipriano</i>	534
Linear Reactive Power Optimization in Power Systems Using an Interior Point Algorithm	
<i>Chen Xibin, Zhang Wenliang, Zhou Xueliang, Li Guangxi</i>	539
Discrete VAR Optimization near to Global Optimum by Genetic Algorithm	
<i>Fan Mingtian, Zhang Zuping, Huang Biwu</i>	542
A Coordinated Neural Network-Based Control Strategy to Enhance Stability in Long Distance Transmission Systems	
<i>M. La Scala, D. Salatino, R. Sbrizzai, F. Torelli, M. Trovato</i>	546
Sensitivity of Transient Voltage Stability to HVDC and SVC Dynamic Control Characteristics	
<i>A.E. Hammad</i>	551
Design of Decentralized Robust Excitation Controllers Based on H_{∞} Control Theory	
<i>S.S. Ahmed, A. Petroianu</i>	559
On Voltage Stability in Electric Power Systems	
<i>Y.H. Song, J.F. Macqueen, D.T.Y. Cheng, A. Arnal</i>	566
Simulation Study of a Comprehensive Compensator System for Reactive Power and Harmonics in Power Systems	
<i>Li Gengyin, Chen Zhiye, Yang Yihan, Lu Fangcheng, Liu Guanqi</i>	571
Effect of Excitation Control on Dynamic Voltage Stability	
<i>Feng Zhihong, Zhou Shuangxi, Hu Yutao</i>	576

**Session A3: EEAC and Other Fast Computing Methods
for Power System Dynamics**

Date & Time: Wednesday, Oct. 19, 1994 , AM

Direct Estimation of Swing Mode Eigenfrequency and Robustness Improvement of the AESOPS Algorithm	
<i>Xue Yusheng, H. Sasaki, J. Kubokawa</i>	581
Incorporation of Fast Valving and Generator Tripping in Extended Equal Area Criterion	
<i>Xue Yusheng, Li J., Mao X.</i>	592
A Sparse Formulation and Implementation of the Transient Energy Function Method for Dynamic Stability Analysis	
<i>G.C. Ejebe, G.D. Irisarri, W.F. Tinney, V. Vittal, A.A. Fouad</i>	599
Fast Estimation of Transient Stability Limits by Combining Direct Method with Least Squares Technique	
<i>Yao Liangzhong, Xie Zhengguo, Ni Yixin, Mao Peilin</i>	606
A Study of Artificial Neural Network Based Dynamic Security Assessment of Electric Power System	
<i>Chen Jianlin, Ni Yixin, Fu Shuti, Hu Jiaxiao</i>	611
Direct Transient Stability Margin Assessment of Power System with SVC Control	
<i>S.K. Tso, S.P. Cheung</i>	616

**Session P2: Power System Planning Transmission
Network and Interconnection**

Date & Time: Wednesday, Oct. 19, 1994 , PM

A New Efficient Approach for Medium-Long Term Transmission Network Expansion Planning	
<i>Wang Dongsheng, Liao Peihong, Wang Minyou</i>	621
Transmission System Reliability Analysis — The Model TRELSS	
<i>A.P.S. Meliopoulos, M. Kumbale, T. Rusodimos, R. Kovacs, T. Bakirtzis, Xingyong H. Chao, B. Redwine, N. Balu</i>	625
An Interactive Software Package for Transmission Expansion Planning	
<i>Fu Chengjun, Tian Weidong, Qian Weiwei</i>	630
Expert System Aided Interconnected Power System Planning with Decomposition Methodology	
<i>Liu Zhaoxu, Gu Biquan, Zheng Meite, Yin Yonghua, Ye Yunliang</i>	633
The Establishment of South China Interconnected System and Its Development Strategy	
<i>Guo Benfu</i>	637
Environment Decision Analysis Model for Power System Planning	
<i>Zhang Peng, Li Yonggang, Tian Weidong</i>	641
Investment and Financial Analysis in Power Planning	
<i>Qian Weiwei, Tian Weidong</i>	644

The Fuzzy Method to Consider the Operation Economy in the Transmission Network Planning	
<i>Gao Zhongwen, Wang Xianrong, Yu Jilai, Liu Zhuo</i>	648
 Session G3: <u>Power System Simulation and Modeling</u>	
Date & Time: <u>Wednesday, Oct. 19, 1994 , PM</u>	
Real-Time Simulation of Power Systems	
<i>Charles Gagnon, Harbans Nakra</i>	652
The Software for Simulation of Complicated AC/DC Power Systems	
<i>Yu.N. Kuchеров, O.M. Kucheroва, A.E. Ushakov, E.I. Ushakov, O.N. Shepilov</i>	657
Power System Modeling and Simulation: Need for Improvement in Existing Simulation Models	
<i>M. Tariq J. Khan</i>	662
Power System Simulator for Energy Management	
<i>S. Kuloor, G.S. Hope, O.P. Malik</i>	666
Parameter Identification of Large Generators in Power System from AC/DC Test by Using a New Microprocessor-Based Identifier	
<i>Qiu Changtao, Nie Hongzhan, Teng Guobo, Liang Baoshan, Jie Jinxing, Li Changxin, Song Fajian, Wang Suzhi</i>	671
Electric Load Modeling Using Self-Organizing Neural Network	
<i>Han Minxiao, He Renmu</i>	676
The Identification of Physically Based Power System Load Models	
<i>Bai Jianhua, Shen Shande, Gao Jingde</i>	681
Identification for Load Performance in Time	
<i>Chen Binghua, Hu Zhibin</i>	684
Power Flow Controller Models for Power System Simulations	
<i>J. Bian, T.A. Lemak, R.J. Nelson, D.G. Ramey</i>	687
 Session H3: <u>Power Apparatus (Transformer, Generator and Motor)</u>	
Date & Time: <u>Wednesday, Oct. 19, 1994 , PM</u>	
Dynamic Rating of Oil-Immersed Power Transformers	
<i>H.C. Soo</i>	692
Ways to Improve the Reliability of UHV Transformers	
<i>Å. Carlsson</i>	695
Electrostatic Properties of Transformer Oils and Static Electrification Tests on Transformers	
<i>Zeng Hong, Ling Min</i>	699
Two Methods of Digital Diagnosis in Impulse Tests of Power Transformers	
<i>Qi Qingcheng, Wang Xuegang, Chen Changyu, Yang Xuechang, Sheng Xinfu</i>	703

Experimental Study of Pulse Propagation in Turbine Generator Stator Windings	
<i>Li Qiong, Jiang Jianguo, Tan Kexiong, Zheng Fengshi</i>	708
Orthogonal Matrix Integral Triphase VFVA Sinusoid Generator and Speed Control of PWM Variable Frequency	
<i>Lin Qi</i>	713
An Approach to a Knowledge-Based Diagnostic System for Power Equipment Maintenance	
<i>M.A. Marin, S.N. Banerjee</i>	717
System Voltage Stability Indication by Rotor Heating Assessment	
<i>W.R. Lachs, D. Sutanto</i>	721
A Study of Magneto-Optical Current Transformer	
<i>Zhang Guixin, Pai S.T., Lou Chengmu</i>	726

Volume 2

Session D2: HVDC System
 Date & Time: Wednesday, Oct. 19, 1994 , PM

Itaipu HVDC Transmission Operation Experiences	
<i>K. Eriksson, J. Graham, A.C. Branco, A. Praca, G. Biledt, E. Zveiter, H. Arakaki</i>	731
Chandrapur Back-to-Back HVDC Scheme in India	
<i>J.D. Wheeler, J.L. Haddock</i>	742
Long Distance DC Transmission with AC Transmission Characteristics	
<i>Xuegong Wang, D.A. Woodford</i>	748
HVDC/AC Long Distance Transmission: Methodology for Studies, Digital Tools and Simulator Use	
<i>E. Salgado, A.R. Carvalho, M. Roitman, A. Praça, H. Arakaki</i>	752
Stability of Tian-Guang HVDC and HVAC Transmission System	
<i>Quan Bailu</i>	761
Stability in Weak Power System Supplied by HVDC	
<i>Jan Ove Gjerde, Terje Gjengedal, Roger Flolo</i>	766
Investigations on the Outdoor Insulation of ± 800 kV DC Transmission Systems	
<i>Dong Wu, R. Hartings, U. Åström</i>	771
Analysis of a Bipole Forced Outage by SSR Protection in Ge-Nan HVDC Link	
<i>Zeng Nanchao, Wang Mingxin</i>	775
Behaviors of Air Gap in HVDC Converter Station	
<i>Huang Shengjie, Tang H.S., Chen C.S., Wang F.M., Liu W.J., Huang X.Q.</i>	780
Characteristics of Corona on Gezhouba-Nanqiao ± 500 kV HVDC Transmission Line	
<i>Fu Binlan</i>	784

Session O3: Power System Contingency and Emergency
Date & Time: Wednesday, Oct. 19, 1994 , PM

Fast Adaptive Localization of Contingency Studies	
<i>V.S. Vankayala, G.S. Hope, O.P. Malik</i>	789
A Practical Contingence Analysis Software Package in EMS	
<i>Wang Haining, Liu Guangyi, Yu Erkeng, Wang Wei, Liu Guoqi, Zhang Li</i>	794
A Control Scheme for Emergency State Control of Interconnected Power Systems with Multistage Recursive Least-Squares Identification	
<i>Li Xingyuan, Liu J.Y., Wang G.D., O.P. Malik</i>	799
Emergency Control of Generation/Load for CCT Limit by PEBS Method with Linearized Sensitivity Coefficient	
<i>Hu Jiaxiao, Fu Shutu, Chen Jianlin</i>	803
Minimising Grid Disturbances in a Low Performance Grid	
<i>M.S.S. Raghavan, K.C.V. Ramanamurthy, N.S.M. Rao</i>	806
Digital Simulation of Random Faults on AC/DC Transmission Lines and Their Analysis	
<i>Chen Chaoying</i>	811
Advanced Security Monitoring System for a New Control Center	
<i>Motonobu Yoshikawa, Hiroshi Nakajima, Masatoshi Okubo, Hiroyuki Kudo, Chihiro Fukui, Shigeru Tamura</i>	821
An AC to AC Frequency Changer for UPS/Power Line Frequency Synchronization	
<i>ALI I. Maswood</i>	825

Session V2: Voltage and Reactive Compensation
Date & Time: Wednesday, Oct. 19, 1994 , PM

Exact Decentralized Optimal Excitation Control of Multimachine Systems	
<i>Qiang Lu, Zheng Xu, Takoro Mochizuki, Sun Yuanzhang</i>	830
The Application of Synchronous Machine's Negative Excitation to Power System	
<i>Chen Junlin, Cao Shengmin, Cao Lu</i>	835
Artificial Neural Network Adaptive Excitation Controller	
<i>Han Yingduo, Xiu Lincheng, Jiang Qirong</i>	838
A Novel AVR Test Device Based on Digital Simulation of Synchronous Generator	
<i>Zhou Guixing, Zhang Ming, Sun Dechang</i>	842
Optimal Switching of Booster Transformers in HV and EHV Power Systems	
<i>Li Naihu, Jiang Ping</i>	846

Optimal Placement Planning of Compensating Capacitors and Reactors in Urban Power Transmission Networks	
<i>Cheng Haozhong, Chen Zhangchao, Hiroshi Sasaki, Naoto Yorino, Din Gaoshan, Ren Nianrong</i>	851
Digital Simulation for Overall Start-Up of G/M in Pumped Storage Plant with SFC	
<i>Wen Jun, Zhou Bo, He Fufa</i>	856
A Neural Network Based Observer for Field Oriented Induction Motor Control	
<i>Huachun Miao, W.W.L. Keerthipala, B.R. Duggal</i>	860

Session A4: Power System Transient Stability and Computation

Date & Time: Wednesday, Oct. 19, 1994 , PM

Basic Requirements for a System of On-Line Stability Limit Analysis at Hydro-Quebec	
<i>L. Riverin, J.A. Huang, A. Valette, F. Lafrance</i>	865
A Parallel Algorithm of Transient Stability in Power System	
<i>Qiu Changtao, Wang Wei</i>	870
Application of BESP for Power System Damping and Transient Stability Enhancement	
<i>D. Prasetyo, D. Sutanto</i>	875
Transient Stability Analysis by Using Operation Pattern	
<i>Yu Jilai, Gao Zhongwen, Liu Zhuo</i>	880
Sensitivity Analysis of Transient Energy Margin with Detailed Power System Models	
<i>Li Zhimin, Chen Xueyun, Liu Zhuo, Hu Xilong</i>	884
A Fast Preventive Control Method of Multi-Machine Power Systems Transient Stability Based on Observation of Generator Dynamics	
<i>Li Guoqing, Guo Jinlai, Sui Yongzheng</i>	888

Session P3: Power System Planning (other topics)

Date & Time: Thursday, Oct. 20, 1994 , AM

Application of Multi-Hierarchical Comprehensive Evaluation to Transmission Network Expansion Planning with Load Growth Uncertainty	
<i>Zhang Hongming, Zhong Jianzhong, Liao Peihong</i>	892
Uncertainty Models Applied to the Substation Planning	
<i>R.N.F. Filho, J.C.O. Aires, D.L.S. Tortelly</i>	897
Brazilian Program of Electrical Energy Conservation: Results, Experience and Future Challenges	
<i>P.C.C. Tavares, G. Pimentel, A.C. Pinhel, R.S. da Costa</i>	902

Long Term Operation Planning of Multi Reservoirs System with Neural Network Based Inflow Forecast	
<i>Zhou Junren, Zhang Daoyuan, Deng Huijun</i>	906
The Recursive Forecasting Model with Neural Network and Its Use in Forecasting	
<i>Wu Xuan, Zhou Xiaoxin, Hu Zhaoyi</i>	911
An Approach for Generator Maintenance Scheduling Based on General Expert System and Fuzzy Constraints	
<i>Zhang Zuping, Fan Mingtian, Lei Shaofeng</i>	916

Session G4: Power System Economics
Date & Time: Thursday, Oct. 20, 1994 , AM

Evaluation of Trade-Off between Economic and Environmental Costs in Power Dispatch: Simulated Annealing Approach	
<i>Kit Po Wong, Chun Che Fung</i>	920
FEPSS: A Fast Multi-Area Production Costing Software	
<i>Tian Weidong, D. Sutanto, H.R. Outhred, A. Potter, H. Pan</i>	925
Distribution Network Loss Minimization Using Islanding Techniques	
<i>H. Shaibon, A.A. Mohd Zin, Y.S. Lim, K.L. Lo</i>	929
Cost of Outage in Selangor and Kuala Lumpur/Malaysia	
<i>N.M. Din, N.A. Kadir, M.Z. Jamaludin, F. Ibrahim</i>	934
A Diagonal Recurrent Neural Network Based Decentralized Control Architecture for Power System Stabilization	
<i>Young-Moon Park, Myeon-Song Choi, Bong-Hee Kim, Kwang Y. Lee</i>	939

Session F1: Flexible AC Transmission System
Date & Time: Thursday, Oct. 20, 1994 , AM

Steady State Analysis and Load Flow Calculation of Unified Power Flow Controller in Power Systems	
<i>Wu Shouyuan, Zhou Xiaoxin, Zhao He, Zhang Wentao</i>	944
Unified Power Flow Controller in Power System to Improve Power System Stability	
<i>Wu Shouyuan, Zhou Xiaoxin, Zhao He, Zhang Wentao</i>	949
System Control Strategies for Flexible AC Transmission Systems	
<i>H.W. Ngan</i>	955
Real-Time System Studies for FACTS and Protection	
<i>R. Krebs, A. Kumar, C. Pretorius, D. Retzmann</i>	958
Application of FACTS-Elements in Meshed Systems	
<i>E. Lerch, Li Wenping</i>	963
Planning Aspects of 525 kV Phase Shifters and Static VAR Compensators for the Mead-Phoenix and Mead-Adelanto Transmission Projects in the Southwestern U.S.	
<i>R.L. Lee, M.J. Beshir, A.T. Finley, D.R. Hayes, J.C. Hsu, D.W. Gerlach, R.S. Thallam, T.G. Lundquist</i>	970