

# IEEE PES Panel

on

## Intelligent Techniques for Transmission System Control



Om Malik, *Life Fellow, IEEE*



Joe Chow, *Fellow, IEEE*



Ganesh Kumar Venayagamoorthy,  
*Senior Member, IEEE*



Narain Hingorani, *Life Fellow, IEEE*



Kwang Lee, *Fellow, IEEE*



Ron Harley, *Fellow, IEEE*

# Discussions

- What is state of the art today on electric power grid in terms of transmission control?
- Are there any adaptive controllers/dynamic mechanisms in place?
- Any intelligent techniques applied?
- What does industry need to adopt intelligent techniques?
- What/Where are the grey areas?
- What are the unaddressed research issues/challenges, if any, by this community to strengthen the transfer of such technology (intelligent techniques) to industry?
- Where from here?

# Om Malik, *Life Fellow, IEEE*

Professor Om Malik graduated in 1952 from Delhi, India. After working for nine years in electric utilities he returned to academia and obtained a Master's Degree from Roorkee University, India in 1962, a Ph.D. from London University and a DIC from the Imperial College, London in 1965. He was teaching and doing research in Canada from 1966 to 1997 and continues to do research as Professor Emeritus at the University of Calgary, Canada.

Professor Malik has done pioneering work in the development of adaptive and artificial intelligence based controllers for application in electric power systems over the past thirty years. After extensive testing in the laboratory and in actual power systems, these controllers are now employed on large generating units.

Professor Malik is a Fellow of the Engineering Institute of Canada, Canadian Academy of Engineering, Institution of Electrical Engineers, World Innovation Foundation and a Life Fellow of IEEE. He has received many awards from IEEE, EIC and APPEGA and the University of Calgary.



# Joe Chow, *Fellow, IEEE*

**Professor Joe H. Chow** received the B.S.E.E. and B.Math. degrees from the University of Minnesota, Minneapolis, and the M.S. and Ph.D. degrees (1977) from the University of Illinois, Urbana.

He is a Professor of electrical, computer, and systems engineering at Rensselaer Polytechnic Institute, Troy, NY, and the Associate Dean for Research and Graduate Programs, School of Engineering. Before joining RPI in 1987, he worked in the power system business of General Electric Company.

His current research interests include modeling and control of power systems, voltage-sourced based FACTS controllers, and synchronized phasor measurements.

He is Fellow of IEEE.



# G. Kumar Venayagamoorthy, *Senior Member, IEEE*

Ganesh Kumar Venayagamoorthy received the B.Eng. degree in electrical and electronics engineering from Abubakar Tafawa Balewa University, Bauchi, Nigeria, in 1994 and the MScEng and PhD. degrees in electrical engineering from the University of Natal, Durban, South Africa, in 1999 and 2002, respectively. He is currently an Associate Professor of Electrical and Computer Engineering and the Director of the Real-Time Power and Intelligent Systems Laboratory at University of Missouri-Rolla, (UMR).



Dr. Venayagamoorthy's research interests are in the development and applications of computational intelligence for real world applications including power systems stability and control, FACTS devices, power electronics, alternative sources of energy and sensor networks. He has published 2 edited books, 3 book chapters, 50 refereed journals papers and 190 refereed international conference proceeding papers. He has attracted close to US \$ 4 million in research funding to date.

He is the Chair of the Working Group on Intelligent Control Systems, the Secretary of the Intelligent Systems subcommittee and the Vice-Chair of the Student Meeting Activities subcommittee of the IEEE PES.

Dr. Venayagamoorthy was a recipient of the 2007 ONR Young Investigator Program Award, the 2004 NSF CAREER Award, the 2006 IEEE PES Walter Fee Outstanding Young Engineer Award, the 2005 IEEE Industry Applications Society (IAS) Outstanding Young Member Award, the 2005 SAIEE Young Achievers Award, the 2004 IEEE St. Louis Section Outstanding Young Engineer Award, the 2003 INNS Young Investigator Award, a 2006 UMR School of Engineering Teaching Excellence Award, and a 2005 UMR Faculty Excellence Award.

# Narain Hingorani, *Life Fellow, IEEE*

Dr. Narain Hingorani began his education at Baroda University in India, graduating with a B.Sc. in electrical engineering in 1953. After two years with the Bombay Electricity Board, he moved to England, earning his M.Sc. and Ph.D. at the University of Manchester Institute of Science and Technology in 1957 and 1961 respectively. He earned his D.Sc. from the university in 1994. After 20 years at EPRI, five years as vice president, electrical systems division, he retired to start his own consulting business in the development of power electronics and devices, and the application of power electronics to transmission, distribution, industrial power, and marine power systems.



Dr. Hingorani is the recipient of the Institute of Electrical and Electronics Engineers (IEEE) Lamme Medal and the IEEE Power Engineering Society's Uno Lamm Award. In 2004, in recognition of his pioneering of FACTS and custom power technologies, the IEEE Power Engineering Society decided to name its FACTS and Custom Power Awards as the "Nari Hingorani FACTS Award" and the "Nari Hingorani Custom Power Award."

Dr. Hingorani is the recipient of the 2006 Bower Award and Prize for Achievement in Science was presented to Narain Hingorani for the *conceptualization and pioneering advancement of the Flexible AC Transmission System (FACTS) and Custom Power in electric power systems, and for outstanding technical contributions in HVDC Technology, which have enhanced the quality and security of the electric power system.*

Dr. Hingorani is a life fellow of IEEE and a member of the National Academy of Engineering.

# Kwang Lee, *Fellow, IEEE*

Professor Kwang Y. Lee received the B.Sc. degree in electrical engineering from Seoul National University, Seoul, Korea, in 1964 and the M.S. degree in electrical engineering from North Dakota State University, Fargo, in 1968. He received the Ph.D. degree in system science from Michigan State University, East Lansing, in 1971.

Professor Lee, is the Director of Power Systems Control Laboratory, and an educator and researcher in power systems and control systems, especially in intelligent control systems. He has authored and co-authored over 170 papers and 10 book articles in the area.

Dr. Lee's interests are power systems control, operation and planning, and intelligent system applications to power systems and power plant control.

He is Fellow of IEEE.



# Ron Harley, *Fellow, IEEE*

**Professor Ronald G. Harley** received the M.Sc.Eng. degree in electrical engineering from the University of Pretoria, South Africa, in 1965, and the Ph.D. degree from London University, London, U.K., in 1969. He is currently the Duke Power Company Distinguished Professor at the Georgia Institute of Technology, Atlanta.

His research interests include the dynamic behavior and condition monitoring of electric machines, motor drives, power systems and their components, and controlling them by the use of power electronics and intelligent control algorithms. He has co-authored some 380 papers in refereed journals and international conferences and three patents.

Dr. Harley is a Fellow of the IET. He is also a Fellow of the Royal Society in South Africa and a Founder Member of the Academy of Science in South Africa formed in 1994.

During 2000 and 2001, he was one of the IEEE Industry Applications Society's six Distinguished Lecturers. He is a recipient of the Cyrill Veinott Award in 2005 from the Power Engineering Society for "*Outstanding contributions to the field of electromechanical energy conversion.*"

