Significant Research Contributions
of
Prof. (Dr.) Janardan Nanda

Prof. Nanda's significant contributions are in analysis, stability, control, and optimization of large scale electric power systems. He has innovated many powerful load flow algorithms which are widely referred by researchers and power utilities.

His contributions to selection of optimum gains for Automatic Voltage Regulator for stability improvement of large alternators using D-Decomposition technique are original. He has also contributed significantly to the design of variable structure power system stabilizers with desired eigen values in the sliding mode and to adaptive power system stabilizers based on pole-shifting technique for improvement of system stability.

Prof. Nanda has innovated a powerful and more exact model for transmission loss formulation through a set of new" A" coefficients in place of inexact" B " coefficients used in practice. He has discovered a classical model based on coordination equations for optimum reactive power dispatch. This model has been successfully applied to the northern regional grid of India resulting in significant reduction in system transmission loss. He has made a maiden attempt to apply linear and nonlinear goal programming and Fletcher's quadratic programming techniques to solve economic emission load dispatch and optimal power flow problems.

Many of his works in the area of automatic generation control (AGC) for both thermal and hydrothermal systems qualify as pioneering. He has amply demonstrated that the low value of governor speed regulation parameter" R" of the order of 4 to 6 % droop used in practice can be substantially increased to 3 to 4 times (thus revolutionizing the new approach to design of governors that would significantly cheaper and easily realizable) without jeopardizing dynamic performance and even in some cases improving the system performance . He has been the first to propose a continuous-discrete mode (system in continuous and controller in discrete mode) strategy for AGC of thermal and hydro-thermal systems in order to achieve more realistic performance of the system . He has also

applied modern computational techniques such as fuzzy logic, artificial neural networks, genetic algorithm, and bacterial foraging techniques to power system studies so as to explore many new and important findings for large scale power systems . He is the pioneer to apply a very powerful computational technique , the Bacterial Foraging Technique to simultaneously optimize effectively several important design parameters for Automatic Generation Control in a n integrated Power System .

Prof. Nanda has around 250 research publications out of which around 100 research publications are in international journals of repute. He has supervised 22 doctoral level and 150 master's level students. He has chaired many international and national conferences/seminars and has delivered many special state-of-the-art lectures. He has reviewed many technical books in the power systems area and reviewed research papers for the IEEE Transactions, IEE Proceedings, and other journals of repute. He has edited a book entitled "Recent Trends in Electric Energy Systems" published in 1988 by Prentice-Hall India. He is Co-Chief Editor of the International Journal on Management Science and Engineering Management (IJMSEM),Liverpool , U.K .

He has served as visiting professor in U.S.A., Canada, U.K., Germany, France, Australia, Japan, New Zealand, Singapore, Hong Kong, South Korea, Mauritius, and Papua New Guinea and has contributed richly in delivering a large number of state – of – art lectures and initiating collaborative research .

He is a pioneer in India to introduce computer application in power systems and provide indigenous computer software to Indian power utilities.

On behalf of the Government of India, Prof. Nanda has served as chairman of all Technical Evaluation Committees for the procurement of 500 MW units for the super - thermal power stations in the country.