BIOGRAPHIES OF THE AUTHORS

Engr. Dr Sabo Aliyu completed his Bachelor's degree in Electrical Engineering from the Prestigious Ahmadu Bello University, Zaria, Kaduna State, Nigeria in 2011. He also completed his M.Sc. and Ph.D Degrees in Electrical Power Systems Engineering from University Putra Malaysia. He is currently a Senior Lecturer and the Principal Investigator at the Center for Power Systems Dynamic Simulation, Department of Electrical and Electronic Engineering at the Nigerian Defence Academy, Kaduna State, Nigeria. His main research areas include the application of Neuro-Fuzzy Controllers to power systems, Computational Intelligence techniques, Power System Oscillation Damping Controller Designs, Power Systems Optimizations, Power System Stability (both static and dynamic), Artificial Intelligence Applications in Smart Grid, Micro grids and Renewable Energy, Modelling and Simulation of Power Systems with Renewable Energy, Optimal Power Flow, Power Quality, and Robust controllers. He has published more than 60 International conference and High Impact Quartile International Journal papers during his research profession. He was a researcher at University Putra Malaysia Centre for Advanced Lightning, Power and Energy Research (ALPER), Serdang, Malaysia and a Member of IEEE Power and Energy Society (IEEE-PES), a Member of Malaysia TRIZ Innovation Association (MyTRIZ), a pioneer Member of African TRIZ Innovation Association and the Nigerian International TRIZ Society representative. He is a registered Engineer under the Council for the Regulation of Engineering in Nigeria (COREN). His research output is cited 305 with an H-index of 11 on Google Scholar.

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POWER SYSTEM MODEL TOOLBOX WITH TRADITIONAL DAMPING CONTROLLERS MACHINE LEARNING AND HYBRID ARTIFICIAL COMPUTATIONAL INTELLIGENCE SYSTEM

Sabo Aliyu Ph.D
Theophilus Ebuka Odoh

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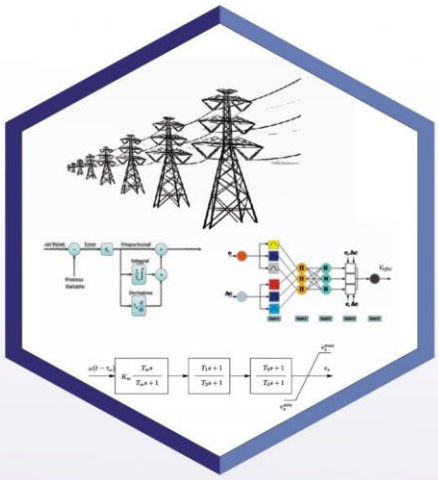

GitHub MATLAB

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ABSTRACT

Power system dynamics and control is one of the most important courses in BSc/BTech, MSc/MTech and PhD programs of Electrical Engineering at most universities worldwide. Due to the practical nature of this course, students cannot appreciate the course properly. This Manuscript presents a toolbox based on simulations and programs in MATLAB software that are useful for the practical application of power system dynamics and control. The toolbox incorporates Matpower and Simulink implementation of two different types of power system models incorporated with Proportional Integral Derivative, Fractional Order Proportional Integral Derivative, Tilt Integral derivatives, Power System Stabilizer control and Neurofuzzy Controller. The controllers are designed using an Artificial ecosystem optimization algorithm, Ant bee colony algorithm and Particle Swarm Optimization. The first model is run alongside Matpower for power flow studies which calculates steady state operating conditions, while the second includes the power flow programs. The Simulink interface is utilized to solve the differential-algebraic equations (DAE). The power system models are presented in single-machine infinite bus, 3-machine power system and 10-machine power system. The results of the damping controller design are explained for all the controllers installed in each power systems model. All the program codes and models are available at the GitHub links attached in the necessary sections: for verification purposes. However, for proper understanding, it is advisable to follow the step-by-step guide to build your model and then verify it against the model in the GitHub link.