# Abstract


## Ahmed K Ali


### Voltage instability detector based on Phasor Measurement Units using artificial neural network


The illustration of a neural network based voltage instability detector utilizing broad region observing system and the calculated angle of the installed Phasor Measurement Units (PMUs) is introduced in this paper. Voltage instability is regarded one of the serious troubles that harshly shape the electric power quality. The system which is affected by voltage instability can be easily subjected to a rapid breakdown due to voltage collapse. A planned neural network based voltage instability detector is presented throughout this paper. This detector counts on the installed PMUs bus voltage angles. An enhanced Feed-Forward Neural Network (FFNN) is planned and trained. The FFNN includes one input layer, two hidden layers, and one output layer. The major advantage of the smart enhanced system is that, it can sense the voltage instability of the whole power system buses in the same time. The enhanced designed system is examined on 14-bus and 30-bus IEEE standard systems. The 14 bus and 30 bus IEEE systems are simulated using MATLAB/power system toolbox program to get each system load flow consequences. In addition, the influence of various loading conditions is used to the simulated system to get their equivalent bus angles values. Concerning each one of the examined system, different studied cases are held for various loading values with different power factors on different buses. The consequences of these cases are listed, normalized and processed using the ANN. While each one of the ANN is trained then the performance of the improved system is examined. The consequences of ANN are tested and regarded to be acceptable because of the high precision and dependable operation.