

Fast prediction of voltage stability index based on radial basis function neural network: Iraqi super grid network, 400-kV

ABSTRACT

With the increase in power demand and limited power sources has caused the system to operate at its maximum capacity. Therefore, the ability of determine voltage stability before voltage collapse has received a great attention due to the complexity of power system. In this paper a prediction of voltage stability index (VSI) based on radial basis function neural network (RBFNN) for the Iraqi Super Grid network, 400KV. Learning data has been obtained for various settings of load variables using load flow and conventional FVSI method. The input data was performed by using a 135 samples test with different bus voltage (V_b), Bus active and reactive power (P_b , Q_b), bus load angle (θ_b) and FVSI_{ij}. The RBFNN model has four input representing the (V_b , P_b , Q_b and θ_b), sixteen nodes at hidden layer and one output node representing FVSI_{ij} have been used to assess the security on line. The proposed method has been tested in the IEEE 30 and a practical system. In Simulation results show that the proposed method is more suitable for on-line voltage stability assessment in term of automatically detection of critical transmission line when additional real or reactive loads are added.

Keyword: Radial basis function neural network; Voltage collapse; Voltage stability index