Thyristor control series capacitor ANFIS controller for damping oscillations

Abstract

This study applies Adaptive Neuro Fuzzy Inference System (ANFIS)-based TCSC controller for damping oscillations. ANFIS which tunes the fuzzy inference system with a back propagation algorithm based on collection of input-output data makes fuzzy system to learn ANFIS controller is designed to damp out the low frequency local and inter-area oscillations of the Multimachine power system. Direct inverse control techniques are used in the design-of TCSC ANFIS controller which is derived directly from neural networks counterpart's methodologies of the power system and the controller network to provide optimal damping. By applying this controller to the TCSC devices the damping of inter-area modes of oscillations in a multi-machine power system is handled properly. The effectiveness of the proposed TCSC ANFIS controller is demonstrated on two area four machine power system (Kundur system) which has provided a comprehensive evaluation of the learning control performance. Finally, several fault and load disturbance simulation results are presented to stress the effectiveness of the proposed TCSC controller in a multimachine power system and show that the proposed intelligent controls improve the dynamic performance of the TCSC devices and the associated power network