A Novel Approach for Optimal Allocation of Series FACTS Device for Transmission Line Congestion Management

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May 5, 2020

Abstract

In competitive environment of electricity market, management of congestion has become utmost important so that the benefits of competitive electricity market remains intact. In this paper, one such scheme has been proposed to manage congestion efficiently. This has been accomplished by implementing TCSC at its optimal location as well as at its optimal parameter setting. Line flow sensitivity factor has been proposed to find the optimal location of TCSC. The optimal parameter setting of TCSC is obtained using particle swarm optimization algorithm. The optimal location and parameter setting of TCSC thus obtained with proposed method are validated through implementation of TCSC based on its minimum installation cost. Two different penalty factors for violation of system constraints are introduced to manage the congestion efficiently. The proposed method is tested on IEEE 30-bus system and IEEE 118-bus system. A 33-bus Indian network has also been considered to analyze the effectiveness of the proposed methodology.

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