A Pattern Recognition System for Fault Analysis in TCSC Based Transmission Line

This paper presents an efficient pattern recognition system for fault classification and section detection in transmission line including Thyristor Controlled Series Compensator (TCSC). The proposed method extracts the features of the three line current samples by using S-Transform (ST). Afterwards, the constructed feature vector is applied as input to two Support Vector Machines (SVMs). The SVM models are trained to determine the fault type and section (whether the fault occurs before or after TCSC which is placed in middle of line) separately. A main characteristic of -ST is that it uniquely combines a frequency dependent resolution of the time frequency space. The proposed algorithm has been implemented on transmission line with TCSC for ten types of fault using PSCAD/EMTDC. The results signify that the combination of ST and SVMs (ST-SVMs) accurately classifies all types of fault and identifies fault section on a 400-kV TCSC-based transmission line.

keywords:
- distance protection
- advanced series compensation
- fault analysis
- pattern recognition

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