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Seminario

Locating Faults in Power Systems: An Approach based on the Wavelet Transform of Travelling Waves

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Abstract

This seminar is concerned about fast and accurate location of power system faults. Fault location can be carried out fairly accurately provided that synchronized signals are available from the terminal buses of the faulted line. However, such measurements are not always available, especially at the lower voltage distribution systems, where the system configuration is essentially radial and measurements are typically taken at a single location at the beginning of the feeder. In such cases, most of the conventional methods fail to provide a solution due to the existence of multiple possible locations corresponding to the measured signals at the root of the feeder. In this presentation, an alternative approach will be described. The essential idea is to monitor the travelling waves initiated by the fault and use the information about network topology to infer the location of the fault. This is accomplished by identifying the arrival times of the travelling waves via the application of the discrete time wavelet transform to the modal components of the fault signals. Examples involving meshed, radial and T-connected power system topologies are given to demonstrate the proposed method. The method is shown to be insensitive to the existence of series capacitors, mutually coupled lines and the unknown value of the fault impedance.