

An Improved Probe Power Unit (PPU) based Fault Location Estimation in Low-Voltage DC Microgrids

Vandan Raj Kamal Aluri¹, S Samantaray¹

¹IIT Bhubaneswar

Good accuracy in estimating the exact fault location in low-voltage DC microgrids (LVDC MGs) reduces the time for fault restoration, power outage and maintenance. Off-line active fault location determination in low-voltage DC microgrid has an advantage of using sufficient information for analysis and reliable decision making. This paper proposes a parametric estimation-based fault location using a more accurate computation of the natural oscillating frequency. The proposed algorithm considers the advantage of both time as well as frequency domain analysis. Peak fittings of the probe current in time domain and exact resonating frequency in the Fourier magnitude spectrum, are used to find out the accurate natural oscillating frequency of the fault path. The proposed fault location technique is tested for various fault conditions of the LVDC network on MATLAB/Simulink environment and provides improved performance even in presence of noise in the measured probe current. The proposed algorithm is found to be robust for different line parameters and network topology of the LVDC network, ensuring an accurate and reliable protection measure for the LVDC network.