Protection Scheme for Utility Network with Wind Power Generation

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Abstract:
A protection scheme method (PSM) is proposed in this manuscript to detect faulty condition on utility grid with wind power generation. This is based on decomposition of currents using Hilbert transform (HT), Stockwell transform (ST), and Alienation coefficient (ACF). A fault index (FI) is designed for detection of fault conditions. An index for ground with fault (GFI) is also designed to recognize involvement of ground during with fault condition. Faults are categorized considering faulty phase numbers and GFI. PSM effectively recognized and categorized the fault events including fault on phase-A and ground (AGF), fault on phases-A& B (ABF), fault on phases-A& B and ground (ABGF), fault on all phases (ABCF) and fault on all phases with ground (ABCGF). Performance of PSM is better compared to ACF based PSM. Study is validated on IEEE-13 nodes test system interfaced with a wind power generator in MATLAB/Simulink.

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