A novel rotor ground-fault-detection technique for synchronous machines with static excitation

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Abstract-

This paper presents a novel ground-fault-detection technique for synchronous machines. This technique is suitable for synchronous machines with static excitation systems, whose excitation field winding is fed by rectifiers through an excitation transformer. The main contribution of this new technique is that it can detect and discriminate both ac- and dc-side ground faults in the excitation system, without the need for traditional power injection sources. This detection technique is based on the frequency analysis of the voltages or currents at a grounding impedance placed at the excitation transformer neutral terminal. This technique has been validated through computer simulations and experimental laboratory tests.

Index Terms- AC generator excitation, power generation protection, power system protection, synchronous generator excitation

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