TEXAS A&M UNIVERSITY
Department of Electrical & Computer Engineering

Friday, February 18, 2022 | 9:10 – 9:35 a.m. CST

Location: ETB 1020

Temperature-Triggered Failure Hazard Mitigation of Transformers Subject to Geomagnetic Disturbances

Abstract

Geomagnetic Disturbances (GMDs) could potentially damage the power grid through reactive power losses and overheating the high-voltage power transformers. A high-impact Low-frequency event such as GMD could induce a hotspot temperature rise over the transformer's overall temperature during a full load condition leading to an accelerated asset loss of life and increased risk of failure. This research focuses on the impact of GMDs on transformers heating and its consequences on transformer's loss of life cycle and failure risk. Moreover, this study presents a transformer hazard mitigation approach to reduce the temperature-dependent transformer risk of failure. The proposed method is tested in the synthetic Texas 2000-bus grid, and the results are numerically analysed, demonstrating the effectiveness of the algorithm.

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Pooria Dehghanian received the B.Sc. degree in Iran, in 2010, and the M.Sc. degree from the Texas State University, Texas, USA, in 2017, both in electrical engineering. He is currently a Research Assistant with the Department of Electrical and Computer Engineering, Texas A&M University, where he is pursuing the Ph.D. degree. He served as the co-director of 2019 IEEE Texas Power and Energy Conference (TPEC). He is currently serving as the chief student leader of the IEEE Power and Energy Society (PES)-Industrial Application Society (IAS)-Power Electronic Society (PELS) at TAMU. He received His research interests include power system resilience, geomagnetic disturbance analysis, power system stability assessment, and smart electricity grid applications.