National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Fault Localization in DG-Integrated Radial Distribution Network Using ANN-Enhanced Impedance Method
Speaker	: Abhilash Asit Kumar Majhi (523ee1002)
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Venue	: Seminar Room (EE-205)
Date and Time	: 21 Jul 2025 (4:40 PM)
Abstract	: Fault localization is a critical challenge in the operation and maintenance of distributed generation (DG)-integrated radial distribution networks. This paper proposes a fault localization approach that combines Artificial Neural Networks (ANN) with two-ended impedance-based method to enhance precision and reliability. The ANN is used for estimating during-fault load currents at unmonitored buses, which are essential inputs for impedance-based method. The ANN model is trained using dataset generated from simulated fault scenarios, considering various fault types and locations across the network. Performance evaluation of multiple ANN training algorithms revealed that the Bayesian Regularization (BR) algorithm achieves the required accuracy. The impedance-based method, augmented with ANN-estimated load currents, is employed to accurately identify both the faulty section and the fault distance. The proposed method is validated on DG-integrated IEEE 33 bus radial distribution network modelled using MATLAB/Simulink, demonstrating superior accuracy and efficiency compared to conventional methods.