National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: DC Bus Voltage Control in P&O MPPT-based Wind-PMSG System using a DC-DC Bidirectional Converter with Storage System
Speaker	: Riju Nandi (523ee1010)
Supervisor	: Prof. Arnab Ghosh
Venue	: Seminar Room (EE-205)
Date and Time	: 22 Jul 2025 (5:00 PM)
Abstract	: This study centers on designing a 5 kW wind energy transformation system integrated with a battery and a bidirectional converter, focusing on efficiently channeling power to the grid and local loads. Maximizing power output while keeping the DC connection voltage constant in the face of wind variations is the most common issue with wind turbine systems. To ensure a stable DC link voltage during standalone operation, this study proposes using a battery as an energy storage, managed by a bidirectional buck-boost converter that seamlessly controls the charging and discharging cycles. Getting the MPP of the wind energy system requires setting the boost converter's switching using the Perturbation and Observation algorithm. This study compares and contrasts PID with 2-DOF PID and 3-DOF PID. The responses of various controllers regarding controlled bidirectional DC-DC converters (BDC) are discussed here.