National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: An Extended Kalman Filter with Updated Noise Covariance for Parameter Estimation in Chemical Reaction Networks
Speaker	: Suryasnata Dash (523ee1001)
Supervisor	: Prof. Abhishek Dey
Venue	: Seminar Room (EE-205)
Date and Time	: 28 Jul 2025 (10:30 AM)
Abstract	: Parameter estimation in chemical reaction networks is a challenging task due to its inherent nonlinearity and stochasticity. Extended Kalman Filters (EKF) have been widely used for this purpose. However, the process noise covariance in the Kalman filter algorithm is hard to determine and the effect of reduced order modelling on estimation is generally unknown. Here, we implement a Continuous Discrete-EKF (CD-EKF) with process noise covariance updated based on Chemical Langevin Equation (CLE). Further, we analyze the performance of the proposed filter, both using full and reduced order models. We find that the filter performance is better compared to fixed choices of noise covariance based on whiteness tests and the filter achieves a balance between mean squared estimation error and parameter convergence time.