National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Dynamic modeling and analysis of coupled rotor-train systems integrated with Active Magnetic Bearings
Speaker	: Mr. Bala Murugan S (518me3031)
Supervisor	: Prof. Saurav Datta (2524), PIC Departmental Seminar
Venue	: ME Seminar Hall (ME-001)
Date and Time	: 23 Jan 2025 (11:00 AM)
Abstract	: The dynamic analyses of rotating systems are always a testing task to obtain definite results. This work carries the dynamic modeling, analysis, and identification of bearing parameters and system faults in a coupled rotor-train system integrated with auxiliary active magnetic bearings (AMBs) support. The system comprises discrete disks, rotor segments with uniform mass and elasticity, and discrete bearings. The rotor-bearing system was analyzed with a finite element model including rotatory inertia, gyroscopic moments, and shear deformation effects. An identification algorithm estimates the dynamic parameters of AMB and rotor residual mass imbalance. The proposed algorithm is a potential method for the analysis of a fully levitated rotor on AMBs. The finite element method is used to model the dynamic flexible rotor system with a PID controller. A conventional dynamic condensation technique is implemented in the development of an identification algorithm to overcome the difficulty in numerical simulation. The least-squares fit technique is deployed to estimate the dynamic parameters in the frequency domain. Then the algorithm is extended to find the misalignment forces and moments at the coupling point. A numerical study is carried out to check the correctness of the algorithm.