National Institute of Technology Rourkela

Progress Seminar

Seminar Title	: Dynamic modeling and analysis of coupled rotor-train system integrated with active magnetic bearings
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Venue	: Seminar Hall (Mechanical Engineering)
Date and Time	: 30 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 is composed of 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 is used to estimate the dynamic parameters of AMB and rotor residual mass imbalance. The proposed algorithm is the right method for the analysis of fully levitated rotors on AMBs. The finite element method is used to model the dynamic flexible rotor system with 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. The numerical study is carried out to check the correctness of the algorithm.