סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ב׳ 14.09.2020

(כ״ה באלול, תש״פ), בשעה 15:00 באמצעות הזום :

https://technion.zoom.us/j/663518327

מרצה : איל ברוך

מנחה : פרופ׳ יצחק בוכר

על הנושא:

זיהוי פגמים ובקרת גלים במערכות בעלות מבנה מחזורי שאינו מושלם
Fault Detection and wave-control of imperfect cyclic symmetric systems

The seminar will be given in English

תקציר ההרצאה :

Cyclic symmetric systems have many uses in the industry, including ultrasonic motors, propulsion, sensing and in bladed Jet turbines disks. Imperfections or defects (aka mistuning) render these systems imperfect and may cause substantial loss of efficiency, excessive vibrations and restricted energy flow. The seminar focuses on identification of the localized stiffness imperfection and its severity, by examining the perturbation of the system's doublet mode shapes from the initial ones of a perfectly symmetric system. The positions of the imperfections are obtained using Autoresonance excitation with modal filtering, and the mode shapes are obtained by finding an excitation which results in a pure standing wave. A second application of the mathematical development is geared to creation of optimal traveling waves (which have common applications in cyclic systems), overcoming the system's mistuning. This is achieved by locking on to an optimal spatial phase of excitation, amplitude ratio and frequency, using online gradient descent based methods. An experimental setup consisting of an acoustic cyclic symmetric system was constructed to validate the findings. The system is composed of a chain of Helmholtz Resonators connected by their necks. Using a lumped equivalent model, it is possible to approximate the dynamics of a system to that of a chain of masses and springs. Excitation of the system was achieved via loudspeakers, and sensing via microphones. The control loop was implemented via Dspace control system. The experimental results are in agreement with the analytical findings.

בברכה,

פרופ״א מתי סאס

מרכז הסמינרים