סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ה' 16.04.15 (כז' בניסן, תשע"ה), בבניין דן-קאהן, קומה 0, באודיטוריום 1 בשעה 14:30.

יוצר: נועם ברק

מנחה: פרופ' יצחק בוכר
מנחה: ד"ר נפתלי סלע, רפא"ל

על הנושא:

Investigating the Controlled Dynamics of an Electromagnetically Damped Rotating System

להלן תקציר ההרצאה:

Rotating systems often sense vibrations which can endanger its own integrity and cause degradation in performance. In order to minimize the accompanied vibrations to the system rotation, it is customary to take the following measures: design a system which is rigid in the desired operation regime, perform dynamic balancing, which ensures that the centers of mass and rotation merge, and that the principal axes of inertia are parallel/perpendicular to the axis of rotation or use a supplemental damping mechanism, which restrains the vibrations. For example: squeeze-film damper or eddy current damper.

Magnetic dampers have an obvious advantage compared to other methods of damping which leads to the on growing usage in modern industry. The advanced computing ability, small and powerful electronics and the requirement for contactless mechanism are a natural incentive to use such designs. The eddy current damper is simple and mechanically robust, therefore requiring little or no maintenance throughout its life. Because the system is non-contacting, the damper can be configured such that the mass loading and added stiffness common with other damping schemes can be avoided. This allows the dynamic response of the system to have a significant increase in damping while avoiding changes in the natural frequencies and mode shapes.

However the mechanism of magnetic dampers, in their most traditional design, may cause instability behavior while operating in the super-critical regime. This research proposes a novel approach to supply stability and vibrations reduction for the entire operation regime. It is suggested to produce a rotating magnetic field in such a way that will eliminate the produced forces which cause instability. This rotating active magnetic damper (RAMD), using today electronics and control methods, might be relatively easy to implement.

In the limits of this dissertation, an analytical electromagnetic model will be introduced, closed loop rotating electromagnetic damper control law will be suggested and the investigation of the dynamic behavior will be examined in simulation.

בברכה,

שרון אמיר שמן

מרכז הסמינרים