

סמינר - SEMINAR

הנדך מוזמנת/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 30.03.15
(י' בניסן, תשע"ה), בבניין דן-קאהן, קומה 0, באודיטוריום 1, שעה 14:30.

ירצה:

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על הנושא:

Decomposition of waves, stresses & dynamics in rotating disks

להלן תקציר ההרצאה:

Model based signal-processing bridges the gap between numerical modeling and experimental testing of rotating machines. The present talk will focus on rotating disk dynamics by introducing a novel signal-processing method. The method exploits multiple sensors and is thus capable of handling spatially complex transient dynamics. Rotating disks identification methods rely on special features of rotating elements, e.g. cyclic-symmetry, gyroscopic effects, directional whirling and circumferentially traveling deformations, all have a physical meaning and are exploited in the proposed approach.

The 'eyes' of 'Smart Rotating Machines' are the sensors and the accompanied, real-time signal processing methods play the role of a 'brain' in the assessment of measured data. Indeed 'smart' also means combining advanced sensing capabilities with an electronic brain which is aware of the underlying physics laws to which the model obeys. At the moment, it seems that the pendulum leans heavily towards numerical modeling. Finite Element models are the basis for analysis and design, while testing and measurements provide only limited verification means for some of the model parameters due to poor deployment and simplistic signal processing procedures. The new method narrows the gap between models and experiment and it illustrates what can be gained when they are added.

The presentation will highlight the advantages of model-based signal processing over past and presently used methods and will try to point to a path leading from older methods and techniques towards present, state-of-the-art methods and further into the future where smart machines will have 'eyes' and 'brains'.

Specifically, the presentation will describe spatial, temporal and directional decomposition of rotating machine vibrations during rapid rotational accelerations. Real time signal processing methods that exploit Hilbert transform based decompositions; directional order-tracking and time-frequency maps will be demonstrated via simulations and experiments. The spatial and temporal decomposition method enables a Smart-Machine to assess true stress and strain on parts rotating relative to an array of sensors and thus help to enhance safety.

Emphasis will be put on the role of mechanics and its effect in the design of signal processing approaches. Simulated and experimental results will be shown and discussed.

בברכה,

1901'01 מ'א א'י' ע'ת

מרכז הסמינרים