SEMINAR - סמינר

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ד' 19.06.2019 (ט"ז בסיון תשע"ט), בניין דן קאהן, חדר 217, 14:30.

מרצה:

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על הנושא:

Tailoring nonlinearity for advanced engineering design

The seminar will be given in English

להלן תקציר ההרצאה:

The analysis of linear dynamical systems is significantly simpler than that of nonlinear ones. This brought engineers and practitioners to see nonlinearities as a detrimental phenomenon to be avoided. Confuting this common point of view, in this talk I illustrate how a correct planning of system nonlinearities can largely increase design possibilities, allowing one to attain performance unreachable by linear systems.

Three examples are considered. First, the performance of the tuned mass damper (TMD) is compared to that of its nonlinear counterpart, the nonlinear tuned vibration absorber (NLTVA). The design procedure of the NLTVA and its advantages over the TMD are discussed. Second, the exploitation of properly tuned nonlinearity for bifurcation control is presented. Adopting a straightforward analytical procedure, it is shown how a correct design of the system nonlinearity enables one to avoid catastrophic subcritical bifurcations. In the third example, a procedure to retrieve linear properties in nonlinear systems by the addition of intentional nonlinearities is illustrated. An algorithm for the definition of the proper additional nonlinearities is presented, with respect to the enforcement of force-displacement proportionality and invariance of the resonant frequency, two properties satisfied by linear systems, but usually not by nonlinear ones. Finally, the possible practical implementation of theoretical findings in engineering systems is discussed.

The presented problems are tackled analytically with a special focus on design aspects. Results are validated numerically and experimentally.

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מארח: פרופ' אולג גנדלמן

בברכה,

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מרכז הסמינרים