Technion-Israel Institute of Technology
Faculty of Mechanical Engineering

הטכניון-מכון טכנולוגי לישראל
הפקולטה להנדסת מכונות

סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ד' 11.07.2018 (כח' בתמוז, תשע"ח), בניין דן קאהן, אודיטוריום 1, 13:30.

מרצה: ויקטור קיסלובסקי

מנחה: פרופ'/ח יולי סטרוסבצקי

על הנושא:

Dynamics of the damped and parametrically driven oscillatory models: Effect of essentially nonlinear coupling

The seminar will be given in Hebrew

תקציר ההרצאה :

Dynamics of nonstationary response regimes exhibited by various physical models remains one of the intensively studied topics of applied physics and engineering sciences. These regimes are manifested by either weak or strong amplitude modulations of the response and they emerge in a wide variety of physical and engineering problems such as vibration mitigation in mechanical structures, chatter control of turning processes, energy transfer in oscillatory chains, auto-resonant control of coupled nonlinear waves. In fact, there is a large amount of theoretical and experimental studies dedicated to understanding of this phenomenon in various systems. However, in all these studies less attention has been paid to the effect of essentially nonlinear coupling and parametric forcing on resonant energy transport exhibited by the symmetric oscillatory models. We initiated the current study with consideration of a nonstationary response emerging in the parametrically forced and nonlinearly coupled two-oscillator models as well as a Duffing oscillator subjected to the two parametric forcing terms. In the former model we assumed some general coupling form, weak dissipation and parametric forcing applied on each oscillator. The main focus of the first part was the analytical description of nonstationary regimes exhibited by both models as well as the analysis of intrinsic mechanisms governing their formation and destruction. The work has been further extended to the parametrically driven oscillatory chains subjected to periodic boundary conditions and assuming essentially nonlinear coupling. In this part of the study, we report the existence of three special regimes namely a regime of nonlinear beats as well as the standing and moving breathers. We could partially describe the first two regimes analytically and obtain their zones of existence. In the case of a stationary breather, we confirmed our findings by the bifurcation diagram derived by the numerical continuation method based on the Pseudo-Arclength predictor-corrector algorithm. The overall results of analytical study are in good agreement with the numerical ones.

בברכה,

פרופ"מ מתיו סאס
מרכז הסמינרים