סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 21.11.16 (כ' בחשון, תשע"ז), בבניין דן-קאהן, קומה 0, באודיטוריום 1 בשעה 14:30.

יצרה: איתי גרינברג

מנחה: פרופ' אולג גנדלמן

על הנושא:

Localization in Finite Vibroimpact Chains: Discrete Breathers, Multibreathers and Asymmetric Discrete Breathers

The seminar will be given in Hebrew

להלן תקציר ההרצאה:

We explore the dynamics of strongly localized periodic solutions (discrete breathers) in a finite one-dimensional chain of oscillators. The model involves parabolic on-site potential with rigid symmetric or asymmetric constraints (the displacement domain of each particle is finite), and a linear nearest-neighbor coupling. When the particle approaches the constraint, it undergoes an inelastic impact according to Newton's impact model. The rigid non-ideal impact constraints are the only source of nonlinearity and damping in the system.
Localization with both single and multiple localization sites (discrete breathers and multi-breathers) is considered. Additionally, the asymmetric constraint creates asymmetric discrete breathers as well as discrete breathers which only reach one constraint (single-sided discrete breather) which are also investigated.
We demonstrate that this vibro-impact model allows derivation of exact analytic solutions for the mentioned types of discrete breathers, both in conservative and forced-damped settings. Periodic boundary conditions are considered.
Local character of the nonlinearity permits explicit derivation of a monodromy matrix for the breather solutions. Consequently, the stability of the derived discrete breather solutions can be efficiently studied in the framework of simple methods of linear algebra, and with rather moderate computational efforts.
One reveals that the finiteness of the chain fragment and possible proximity of the localization sites strongly affect both the existence and the stability patterns of these localized solutions. Also, birth of multiple stable asymmetric discrete breather solution gives some insight on the stability analysis.

בברכה,

פרופ"א שאול אלטוביץ

מרכז הסמינרים