סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד׳ 18.08.2021

(י׳ באלול, תשפ״א), בשעה 13:30 באמצעות הזום : https://technion.zoom.us/j/9576079503

מרצה : גלב קרמי

מנחה : פרופ׳ אולג גנדלמן

על הנושא:

Analytic exploration of safe basins in a benchmark problem of forced escape

The seminar will be given in English

תקציר ההרצאה :

The thesis is devoted to analytic exploration of the problem of escape of a classical particle from one-dimensional potential well under harmonic forcing, relevant for a plethora of applications in physics and engineering. Based on the approximation of isolated resonance, the problem is reduced to slow-flow equations on resonance manifold (RM) This simplification allows clear understanding of the transient dynamics in the initial conditions (IC) plane. For the Hamiltonian initial system, the slow flow gains an additional first integral, leading to a completely integrable averaged system. Such a reduction allows easy distinction between escaping and non-escaping ICs. As a benchmark potential, we choose a common parabolic-quartic well with truncation at varying energy levels. The method allows accurate predictions of the safe basins (SB) boundaries for relatively low forcing amplitudes. The derived SBs demonstrate an unexpected set of properties, including decomposition into two disjoint zones in the IC plane for a certain range of parameters. The latter peculiarity stems from two qualitatively different escape mechanisms on the RM. For higher forcing values, the accuracy of the analytic predictions decreases to some extent due to the inaccuracies of the basic isolated resonance approximation, but mainly due to the erosion of the SB boundaries caused by the secondary resonances. Nevertheless, even in this case the analytic approximation can serve as a viable initial guess for subsequent numeric estimation of the SB boundaries. The system is investigated for a variety of parameters: excitation force and frequency, initial and a maximal truncated well energy, and phase angle.

בברכה,

פרופ״ח מתי סאס

מרכז הסמינרים