סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד׳ 9.12.2020

(כ״ג בכסלו, תשפ״א), בשעה 13:30 באמצעות הזום :

https://technion.zoom.us/j/99595313249

מרצה : ניר בן-שעיה

מנחה : פרופ׳ יצחק בוכר

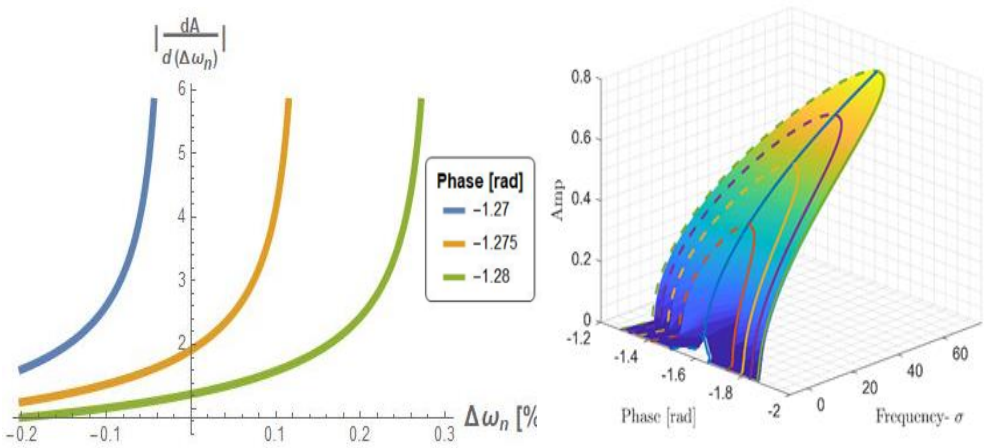
על הנושא:

מדידה של תעלות על ידי עירור פרמטרי אוטומטי של ננו-סיבים
Measuring deep grooves via Auto resonance for parametrically excited nanowires

The seminar will be given in English

תקציר ההרצאה :

In the emerging world of 3D Nano-structures of the micro-electronics industry, measuring the geometry of these structures is a highly important task. Classical tools such as the SEM and AFM are limited and are ineffective in some tasks, such as measuring the geometry of deep grooves. The seminar presents the first steps towards a vibrating nanowire-based sensor that is able to measure such grooves due to intermolecular forces that affect the vibrations. The research exploits the parametric resonance phenomena to create an ultrasensitive sensor, which can be achieved through a base excitation in the longitude direction of the nanowire. In order to obtain robustness and stability throughout the measurement, a closed-loop system was developed to automatically excite the system in primary parametric resonance with frequency ratio of 2:1. The closed-loop is based on setting the phase-lag in the system instead of the resonance frequency. The proposed configuration was examined analytically and numerically and proved to stabilize the, otherwise unstable, response automatically, at arbitrary desired points along the response curves. A scaled experimental setup consisting of a ferromagnetic beam clamped to a base was constructed to validate the findings. The system was excited axially through a voice coil, and the transverse oscillations were measured by laser sensors while the axial movement was measured by an accelerometer. A small magnet was placed near the vibrating structure to simulate the effect of intermolecular forces and good sensitivity to changes in the potential field were observed. The control loop was implemented via a dSpace control system in real time. Experimental results will be shown and correlation with the analytical and numerical findings will be discussed.



בברכה,

פרופ׳/ת מתי סאס

מרכז הסמינרים