סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ה' 21.11.2019 (כ"ג בחשון, תש"פ), בניין דן קאהן, אודיטוריום 1, 14:30.

מרצה: סהר לוסטיג

מנחה: פרופ' דוד אילתה

על הנושא:

Piezoelectric Actuators and Vibrating Energy Harvesters

The seminar will be given in Hebrew

תקציר ההרצאה :

Piezoelectric transducers have great potential in micro actuators and sensors. The large transduction efficiency of piezoelectric structures results from the strong coupling between the mechanical and electrical domains. However, due to this coupling, the governing equations are rather complex, and analysis of practical systems is often challenging.

In this research we revisit the definition of the piezoelectric coupling factor, and show that the traditional definition includes an inconsistency. This factor supposedly measures the amount of energy that may be converted (in quasi-static states) to the mechanical/electrical domain, when the piezoelectric structure is subjected to an input in the electrical/mechanical domain (and vice versa). We provide new insight and show that the coupling factor is not simply a constant that characterizes the material and structure, but rather it also depends on loading.

Piezoelectric vibrating energy harvesters (PVEH) are becoming relevant as power supplies for autonomous sensor systems and internet of things (IoT) applications. We present a simple evolution equation for computing the voltage and current in energy harvesters, which depend on the specific electrical load on the system (e.g. instantaneous heating of a resistor or charging up a battery for later use). We present the analysis of several PVEH systems, and demonstrate the predictive quality of our modeling by comparison to published experimental data.

בברכה,

פרופ"א מתי סאס

מרכז הסמינרים