הטכניון – מכון טכנולוגי לישראל **הפקולטה להנדסת מכונות**

סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ה' 9.06.16 (ג' בסיון, תשע"ו), בבניין דן-קאהן, קומה 0, אודיטוריום 1, 14:30.

יצרה: יואב מלכה

מנחה: פרופ"ח דורון שילה

על הנושא:

Release mechanism by means of a novel actuator based on shape memory wires subjected to high strain rates

The seminar will be given in Hebrew

להלן תקציר ההרצאה:

There are numerous defense and civilian applications that require releasing a pre-contracted mechanical mechanism by an actuator that moves a safety pin against a friction force. The actuator is required to have volume and weight as small as possible, but at the same time to be able to apply relatively large displacements (several millimeters) against large forces. In addition, in many cases the release time has to be short (usually several tens of miliseconds). Nowadays, two types of actuators are in use each suffering from a significant shortcoming. Magnetic actuators are restricted by their small work per volume and pyrotechnic actuators cannot be tested in the production line prior to their application.

We present a new actuator that is based on an ultra-fast activation of nickel-titanium (NiTi) wires by an electric pulse. NiTi is a shape memory alloy that inherently functions as an actuator upon heating. NiTi actuators provide the highest work per volume amongst all other actuators, except for pyrotechnics. However, current NiTi actuators suffer from two major limitations: slow actuation time and small energy efficiency. My research is aimed for overcoming these limitations by means of a novel mode of NiTi actuation and a novel mechanical release mechanism.

The offered mechanical release mechanism exploits the fast response on the ultra-fast NiTi actuator and is designed to form conditions in which the safety pin moves faster than the larger mass that press on it, such that the contact between the masses is disconnected and in accordance the friction force drops to almost zero. The combination of a smaller required work and the improved energy efficiency of the ultra-fast actuation mode results in a reduction of the required energy by 90% with respect to the energy consumption of a conventional NiTi actuator.

בברכה,

שרון אמיר

מרכז הסמינרים