Technion-Israel Institute of Technology
Faculty of Mechanical Engineering

הטכניון-מכון טכנולוגי לישראל
הפקולטה להנדסת מכונות

סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד׳ 12.12.2018 (ד׳ בטבת, תשע״ט), בניין דן קאהן, אודיטוריום 1, 13:30.

מרצה: אלון שיריזלי

מנחה: פרופ׳/ח מרים זקסנהויז

על הנושא:

Bio-inspired CPG controllers for walking bipedal robots

The seminar will be given in Hebrew

תקציר ההרצאה :

Central Pattern Generators (CPGs) are prominent biologically inspired mechanisms to generate rhythmic movements for dynamic walking. In biology, CPGs have been shown to have two main functions: setting the rhythm of the movement, and coordinating the pattern of activity of different joints. In 1-level CPGs, these two functions are performed by a single system, while in 2-level CPGs, these two tasks are performed by two distinct subsystems. In this paper I present a thorough comparison of the learning process and performance of 1-level and 2-level CPG.

Two controllers were designed to implement the two control classes for control of a walking compass biped. The controllers' parameters were tuned using Genetic Algorithm (GA). The results, over multiple runs, demonstrate statistically significant advantage to controllers based on 2-level CPGs in all objectives.

Finally, I analyze Matsuoka Oscillators, which are common building blocks in models of CPGs. An MO is composed of two coupled units, each modeled as a second order non-linear system. Here I investigate limit-cycle stability using numerical and semi-analytical tools.

בברכה,

פרופ"א מתי סאס
מרכז הסמינרים