Mechanical Engineering Seminar

Monday, May 27, 2024 at 14:30, D. Dan and Betty Kahn Building, Room 217

Also available online via this Zoom link

Nonlinear dynamics and mechanics of under-actuated robot motion

Assoc. Prof. **Yizhar Or**

Faculty of Mechanical Engineering, Technion

izi@technion.ac.il ; Website: https://yizhar.net.technion.ac.il/

Host: Prof. Alon Wolf

In under-actuated robots, the number of actuated inputs is smaller than the number of degrees-of-freedom (DOFs) of the robot's motion. In such case, some parts of the robot are moving passively. In addition, the robot's structure and/or joints may undergo elastic deformations, also possibly affected by energy dissipation and friction. Actuation of the robot's active DOFs might be considered as direct control of the joints' kinematics, or mechanical actuation of forces and torques, serial elastic actuators, or even external activation such as magnetic or electrostatic fields, or pressurized internal flow. The coupling of passive DOFs with actuation, elasticity, inertial forces and friction, raises crucial challenges of understanding and analyzing the nonlinear dynamics and mechanics of the robot's motion, rather than just planning kinematics of desired joints' motion. This requires research which combines theoretical models and analysis with experimental work. The talk will present examples of biologically-inspired undulatory locomotion of multi-link robotic swimmers and wheeled vehicles, minimalistic control of soft robotic actuators , as well as hybrid dynamics of legged robots under frictional contacts.

Note: the lecture will be given in English

Seminars Coordinator: Assoc. Prof. Gal Shmuel