MECHANICAL ENGINEERING STUDENT SEMINAR

Wednesday, February 21, 2024, at 13:30, D. Dan and Betty Kahn Building, Room 217.
Online: https://technion.zoom.us/my/izhak

Synchronized dynamics of elastic walking robots

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Robots with flexible and compliant parts are easy to construct and make use of their elastic components to perform kinematic tasks. They can be produced using 3D printing, which eliminates the need for expensive bearings, sliders, and other kinematic pairs.

This study has presented the kinematics and driving sequence of a special flexible 4-legged walking robot. This robot can be driven in a desired trajectory and achieves precise steering using only 2 motors. Each motor controls a Theo-Jansen-like mechanism consisting of 2 legs that are designed using a model optimization algorithm based on the desired trajectory of the legs.

To predict the trajectory of the robot and validate the control process, a quasi-static kinematic model was developed. The model is based on the relative phase between the motors. The model was verified via simulations, and a robot was constructed to demonstrate its movement and control process experimentally.

It was observed that the angle of incidence between the legs of the robot controls its direction and speed. An empirical relationship between the angle of incidence and the robot's rotational speed was found. This relationship was reflected both in dynamic simulations, constructed on computerized kinematic-dynamic model, and in the actual real 3D printed model.

Note: the seminar will be given in Hebrew

מאשר את הגרסה
יצחק בוכר

Seminars Coordinator: Assoc. ??