MECHANICAL ENGINEERING MSc SEMINAR (30 min.)

Thursday, April 16 2026 at 13:30-14:00
Zoom Link: https://technion.zoom.us/j/94302465217

The Development of the MARLIN – A Semi-Submersible Unmanned Vehicle

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Ocean exploration and research are vital for scientific and industrial advancement. While fulfilling this goal can be achieved by manned exploration teams, using unmanned platforms reduces human risk, lowers operational costs, and enables long-endurance missions.

This research discusses the development of the MARLIN, a semi-submersible unmanned vehicle which adopts a SWATH configuration featuring two hulls, four vertical struts, and three transverse connection foils. The MARLIN was designed from the ground up with the primary objective of producing a low-cost and stable vehicle that can be remotely operated and reach at least 5 knots while carrying a horizontal payload at the bow. While many tests were conducted during the design process, this research focuses on the development of a 6-DOF simulation code for the assessment of dynamic stability of the vehicle. The simulation incorporates a comprehensive set of external forces and moments, such as hydrostatics, added mass, drag, and lift forces, alongside the control forces derived by the propulsion system.

The 6-DOF simulation has proven to be an essential and effective part of the MARLIN's design process, to dynamically test the maneuvering performance of the vehicle. Although static stability analysis indicated a stable design, the simulation initially revealed poor stability of the surge motion in the high-speed range. By using this simulation to analyze and modify the vehicle's geometry, we successfully resolved this instability. This highlights the critical necessity of dynamic 6-DOF simulations in the design and validation of novel marine platforms prior to physical prototyping.

Note: the seminar will be given in Hebrew

Seminars Coordinator: Assoc. Prof. Sefi Givli