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

סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 5.09.16 (ב' באלול, תשע"ו), בבניין דן-קאהן, קומה 0, אודיטוריום 1, 14:30.

יוצא: אסף טל

מנחה: פרופ'/ח ראובן כץ

מנחה שותף: ד"ר איציק קליין, רפא"ל

על הנושא:

Modeling and Evaluating Technion's Autonomous Underwater Vehicle for Improving Navigation Performance

The seminar will be given in Hebrew

להלן תקציר ההרצאה:

Underwater operations attract great attention due to environmental matters and potential resources as well as scientific interest. Therefore, the need for underwater robotic systems has become more apparent. With the emergence of autonomous underwater vehicles (AUVs), navigation system plays an important role to accomplish their tasks. Without an operator in the loop, the vehicle must use sensors to determine its position, velocity and orientation. Most of AUVs employ an inertial navigation system (INS) as their main navigation sensor, yet the INS solution drifts with time. Therefore INSs are usually aided by other external sensors or data. For underwater navigation Doppler Velocity Log (DVL), magnetometers and depth sensor are commonly used.

The Technion's AUV (TAUV) project goal is to develop and to produce a miniature, modular, autonomous underwater vehicle, which will serve as a technology demonstrator and a platform for various research programs. In this research, a six degrees of freedom (6DOF) simulation was written for emulating the TAUV. The 6DOF simulation consist of the AUV guidance, navigation and control subsystems as well as a complete hydrodynamic model. Based on this simulation the navigation system performance is evaluated and analyzed. In addition, we derive unique algorithms for improving the navigation performance of the TAUV.

In cases of partial DVL measurements, such as failure to maintain bottom lock, the DVL cannot estimate the vehicle velocity. In many INS such as the one used in TAUV, only the velocity vector can be delivered for INS aiding (loosely coupled). Thus, in partial DVL situations no data can be integrated into the INS and the velocity estimation error will drift in time. To circumvent this problem, we derive approaches for estimating the vehicle velocity based on partial raw data of the DVL and the INS driven velocity. In turn, this velocity is used as aiding to the INS. Numerical results of the fusion process, produced by 6DOF simulation of the closed loop dynamics are presented. Results show the benefits of implementing each proposed approach.

בברכה,

שרון אמיר

מרכז הסמינרים