



13-H0-M041 - Integrated Navigation -> 3 credits

Module description:

- Definition and types of navigation. Classification of positioning methods.
- Determination of attitude and height.
- Inertial navigation: modern method of dead reckoning.
- Radio-positioning: terrestrial and satellite based (GNSS).
- Vision based navigation.
- Integrated navigation with focus on inertial-/GNSS-integration. Fusion of additional sensors.
- Error detection, quality criteria, integrity monitoring.
- First look on route planning and motion control.

Teaching Outcomes

- The students have the knowledge about the essential characteristics of different types of positioning and navigation.
- The students understand the basic principles of dead reckoning and within this field especially the modern technique of inertial navigation.
- The students know further methods of positioning and determination of attitude and additional parameters of motion dynamics, with special focus on GNSS.
- The students have an in-depth understanding of different integration architectures, with respect to sensor types utilized as well as with respect to by way of sensor data fusion determined errors and corrections.
- The students know the most important methods of error detection and quality assessment of the navigation solution.

➤ *Prerequisites: none*

➤ *Literature:*

- Paul Groves. Principles of GNSS, Inertial, and Multisensor Integrated Navigation Systems. Artech House, 2nd edition, 2013.
- B. Hofmann-Wellenhof, K. Legat, and M. Wieser. Navigation - Principles of Positioning and Guidance. Springer-Verlag, 2003.
- Jan Wendel. Integrierte Navigationssysteme: Sensordatenfusion, GPS und Inertiale Navigation. De Gruyter Oldenbourg, 2. Aufl., 2011