FAG5123 Atmospheric Effects on GNSS Signals 7.5 credits

Atmosfäriska effekter på GNSS signaler

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for FAG5123 valid from Spring 2015

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

Course FAG5130 Satellite Based Positioning

Course FAG5129 Theory of Errors

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course the student should be able to:

- Understand and describe the effect of the ionosphere on GNSS satellite signals.

- Understand and describe the effect of the troposphere on GNSS satellite signals.

- Describe and discuss some of the models and methods available for estimation of the atmospheric effects on GNSS satellite signals and for mitigation of these effects in the positioning process.

Course contents

The course is centered around a literature review supplemented with implementation of Matlab scripts, all documented in a written report.

First part of the course is a litterature review whereafter the student must describe the effects of the ionosphere and troposphere on GNSS satellite signals, including a discussion of the temporal and spatial variation of the effects. Also concepts used in practise for mitigating the effects in the positioning process must be described including both models and linear combinations of the GNSS observations.

Then, the student will implement, compare and dicsuss selected models and methods for mitigating the tropospheric and ionospheric effects in the positioning process. The implementation must be done using Matlab, and the scripts must be included with the report for evaluation.

Course literature

Introduction:

Hofmann-Wellenhof, Bernhard, Lichtenegger, Herbert, Wasle, Elmar, 2008. GNSS – Global Navigation Satellite Systems. Springer, Wien, New York.

Ionosphere:

F. Ghafoori. Modeling the Impact of Equatorial Ionospheric Irregularities on GPS Receiver Performance. UCGE Reports no. 20361, September 2012, University of Calgary

Troposphere:

V. B. Mendes. Modeling the Neutral-Atmosphere Propagation Delay in Radiometric Space Techniques. Technical Report no. 199, April 1999, Geodesy and Geomatics Engineering, University of New Brunswick

Selected up to date journal papers

Examination

Based on recommendation from KTH’s coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.