OØ, 11.10.2017

GMSG200 Exercise_GNSS_3
Computer program to compute ECEF coordinates in WGS84 from Broadcast Ephemerides given in the RINEX format.

You might choose programming language on your own. All students have access to Matlab and examples etc. will also be given using the Matlab syntax.

In a main program you shall provide satellite number (PRN), epoch and name of RINEX Navigation-file. The main program shall then call a routine, which computes WGS84-coordinates for given PRN and epoch. The computed coordinates shall be written to an output-file in the form of a documentation file containing name of the student, the task of the program, epoch, satellite number and computed coordinates. The documentation file shall be well organized meaning that the file must be easy to read and that all numbers shall be presented on decimal form with sub-millimeter precision.

Note that in this exercise, no correction for earth correction shall be applied.

A special thing to recognize is that in the computation of broadcast ephemerides, the control segment uses the last updated value for the geocentric gravitational constant:

$GM = \mu = 3.986004418 \cdot 10^{14} \quad m^2 / s^2$

To accommodate backward compatibility for older GPS-receivers, the control segment has however decided to use an older WGS84-value for generation of the quasi-keplerian elements. Users of broadcast ephemerides must therefore also use the same old value:

$GM = \mu = 3.986005 \cdot 10^{14} \quad m^2 / s^2$

Use the following value for the earth rotation rate (NB. There is a printing error in the book of Seeber):

$\omega_e = 7.2921151467\ 10^{-5}$ rad/s

A RINEX Navigation file containing the relevant Broadcast Ephemerides is to be found on Canvas.

In this exercise, you pick the set of orbital elements with reference time (t_{0e}) closest to the given epoch.

RINEX Navigation file:	T827158A.17N
Satellitenr:	PRN10, PRN12, PRN13, PRN15
Epoch:	2017 06 07 07 30 00.00

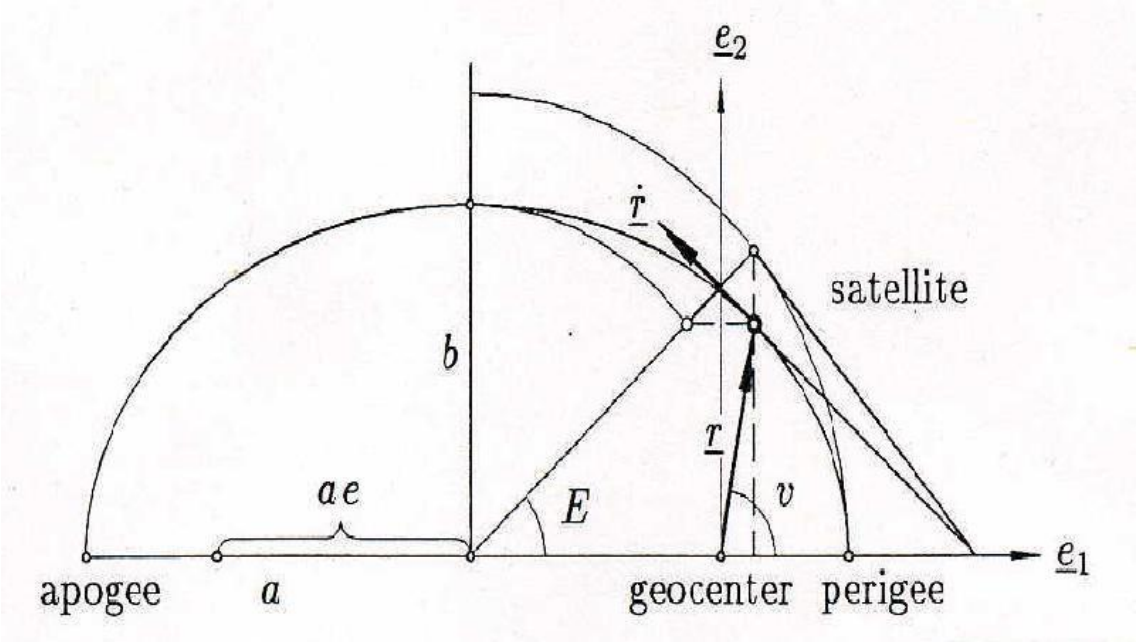
This exercise is compulsory, grading is «passed» or «not passed».

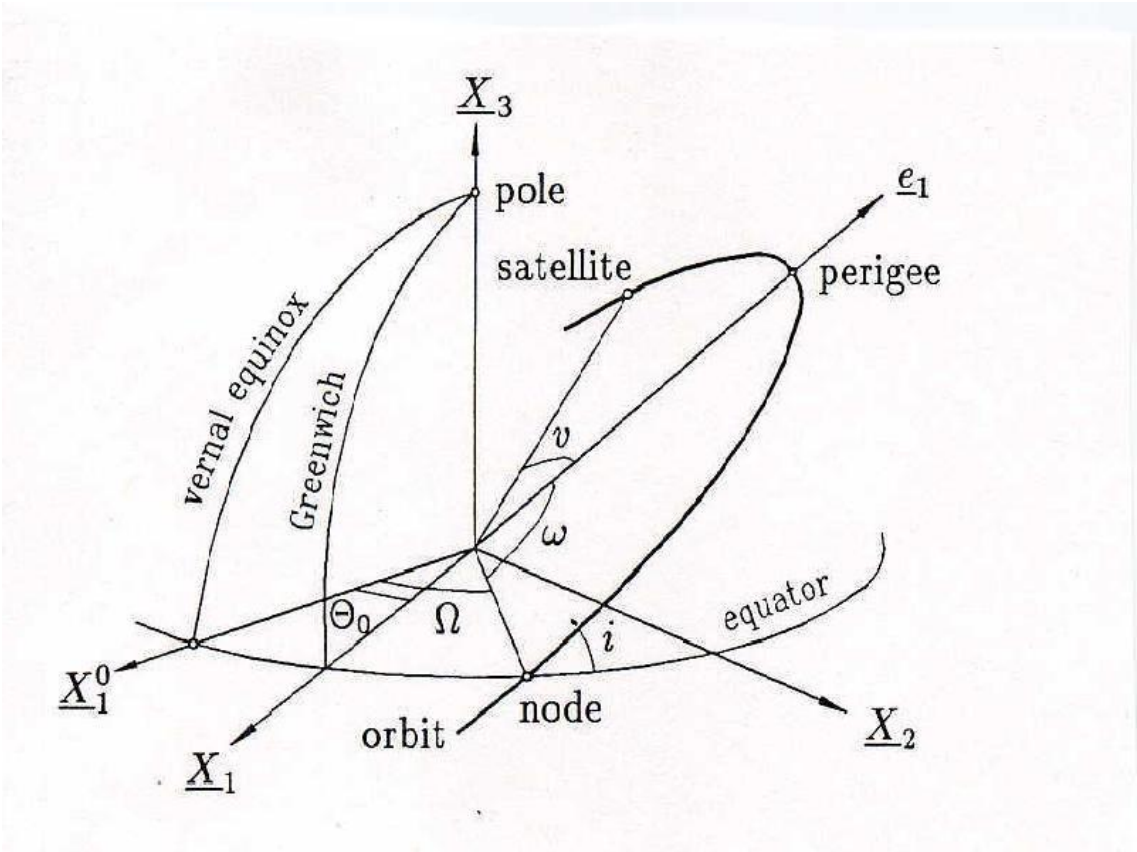
Deliverables:

You submit you exercise digitally on Canvas. The different files hall be packed into one single zip-file.

- Description of the program
- Program listing (e.g. m-file)
- Output-file.
- README.TXT (a text-file enplaning the content of the zip-file)

Deadline: 08.11.2017




$\underline{X}_3$
pole
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