# Lesson 01 (Wednesday 13-Dec-2017)

Input Data:

YSFIL.ASC (Filter solutions: position, velocity, attitude, acceleration, specific force, attitude rates, and their standard deviations (or sigmas)

(YSMTHF.ASC)

Note: Both text files can be opened with “notepad” have same format structure

* First three rows are description to be deleted (option)
* Then you see a 37 columns “matrix” format with text (tab delimited)

Training Objectives:

Using Python programing language to read the file YSFIL.ASC into

1. A matrix format with a size nx37, where n is total number of row:
   1. Output file name: **YSFIL\_Mat.txt** without column titles
   2. Output file name: **YSFIL\_Mat\_Label.txt** with column titles associate with following labels

Note: Except first column with one decimal, all other columns must be 6 decimals

Resolution = 6 decimals

|  |  |  |
| --- | --- | --- |
| Column No. | Label | Comments |
| 1 | Time | sec (time of week in seconds) |
| 2 | pE | Position E-axis, meter, Greenwich Meridian in the ECEF frame |
| 3 | pF | Position F-axis, meter, Meridian , ECEF frame |
| 4 | pG | Position G-axis, meter, North pole , ECEF frame |
| 5 | vE | Velocity E-axis, meter/sec, ECEF frame |
| 6 | vF | Velocity F-axis, meter/sec, ECEF frame |
| 7 | vG | Velocity G-axis, meter/sec, ECEF frame |
| 8 | r | Roll ,radians ,body-frame |
| 9 | p | Pitch ,radians ,body-frame |
| 10 | hdg | Heading ,radians ,body-frame |
| 11 | aE | Acceleration, E-axis, meter/sec2 |
| 12 | aF | Acceleration, F-axis, meter/sec2 |
| 13 | aG | Acceleration, G-axis, meter/sec2 |
| 14 | sf\_fd | Specific force forward, meter/sec2 |
| 15 | sf\_rt | Specific force right, meter/sec2 |
| 16 | sf\_dn | Specific force down, meter/sec2 |
| 17 | rDot | Roll rate ,radians/sec in body-frame |
| 18 | pDot | Pitch rate ,radians/sec in body-frame |
| 19 | hdgDot | Heading rate ,radians/sec in body-frame |
| 20 | SpE | Sigma Position E-axis, meter, ECEF frame |
| 21 | SpF | Sigma Position F-axis, meter, ECEF frame |
| 22 | SpG | Sigma Position G-axis, meter, ECEF frame |
| 23 | SvE | Sigma Velocity E-axis, meter/sec, ECEF frame |
| 24 | SvF | Sigma Velocity F-axis, meter/sec, ECEF frame |
| 25 | SvG | Sigma Velocity G-axis, meter/sec, ECEF frame |
| 26 | Sr | Sigma Roll ,radians ,body-frame |
| 27 | Sp | Sigma Pitch ,radians ,body-frame |
| 28 | Shdg | Sigma Heading ,radians ,body-frame |
| 29 | SaE | Sigma Acceleration, E-axis, meter/sec2 |
| 30 | SaF | Sigma Acceleration, F-axis, meter/sec2 |
| 31 | SaG | Sigma Acceleration, G-axis, meter/sec2 |
| 32 | Ssf\_fd | Sigma Specific force forward, meter/sec2 |
| 33 | Ssf\_rt | Sigma Specific force right, meter/sec2 |
| 34 | Ssf\_dn | Sigma Specific force down, meter/sec2 |
| 35 | SrDot | Sigma Roll rate ,radians/sec in body-frame |
| 36 | SpDot | Sigma Pitch rate ,radians/sec in body-frame |
| 37 | ShdgDot | Sigma Heading rate ,radians/sec in body-frame |

Geodetic Local Coordinate Frames

# Lesson 02 (Thursday 14-Dec-2017)

1. Repeat lesson 01 with data file YSMTHF.ASC (do not need output)
2. Plot 3D position for Lesson 01 (YSFIL.ASC) as above figure 01
3. Plot 3D position for Lesson 02 (YSMTHF.ASC)

Note: plots must be labeled accordingly