EX 04. Ionospheric error map (09/04/19)

Compute 4 maps of ionospheric error corrections
- for elevation 90 degrees
- latitude = -80 to 80 degrees (step 0.5 degrees)
- longitude = -180 to 180 degrees (step 0.5 degrees);
- at 0:00, 6:00, 12:00, 18:00 (GMT)
- using the ionospheric parameters in "ionoparams.dat"

Compute 2 polar maps of ionospheric error corrections
- for an observer located in Milan
- elevation = 0 to 90 degrees (step 0.5 degrees)
- azimuth = -180 to 180 degrees (step 0.5 degrees);
- at 0:00, 12:00 (GMT)
- using the ionospheric parameters in "ionoparams.dat"

To compute the correction for one point you can use the function "iono_error_correction.m":
SYNTAX:
        [corr] = iono_error_correction(lat, lon, az, el, time_rx, ionoparams, sbas);

INPUT:
        lat = receiver latitude   [degrees]
        lon = receiver longitude   [degrees]
        az = satellite azimuth   [degrees]
        el = satellite elevation [degrees]
        time_rx   = receiver reception time
        ionoparams = ionospheric correction parameters
        sbas = SBAS corrections   <optional if available>
OUTPUT:
        corr = ionospheric error correction [m]
DESCRIPTION:
        Computation of the pseudorange correction due to ionospheric delay.
        Klobuchar model or SBAS ionosphere interpolation.

To create the ionoparams variable in the format required by the function
"iono_error_correction.m" copy the following lines:

```
line1 = 'GPSA    7.4506D-09  1.4901D-08 -5.9605D-08 -1.1921D-07       IONOSPHERIC
CORR';
line2 = 'GPSB    9.2160D+04  1.3107D+05 -6.5536D+04 -5.2429D+05       IONOSPHERIC
CORR';
ionoparams = [cell2mat(textscan(line1, '%*s %f %f %f %f %*s')) ...
              cell2mat(textscan(line2, '%*s %f %f %f %f %*s'))];
```

Workflow

Compute 4 maps of ionospheric error corrections

1) Set the elevation of the hypothetic satellite to 90 degrees (Note: At 90 degrees the azimuth is not relevant for the computation of the ionospheric map)
2) Set the time steps for the computation of the maps (in seconds)
3) Define the step of the grid
4) Preallocation of the ionospheric error correction maps
5) Cycle 'for' (3 cycles for) to estimate for each epoch and each point of the map the ionospheric error correction
6) Plot the computed maps (for example with 'geoshow' function)

Compute 2 polar maps of ionospheric error corrections
1) Set the time steps for the computation of the maps (in seconds)
2) Define the step of the grid
3) Set the geodetic coordinates of an observer located in Milan
4) Preallocation of the ionospheric error correction maps
5) Cycle 'for' (3 cycles for) to estimate for each epoch and each point of the map the ionospheric error correction
6) Plot the computed maps (for example with 'geoshow' function)