Antenna Parameters

The antenna parameters file is the place to make the local system configuration and the initialization of some system variables. The parameters file allows the user to configure:

- Azimuth axis north/south orientation
- Maximum number of encoder counts per movement step
- Antenna position limits (including stow position)
  - Note: This is to record the physical stow position determined by external methods.
- Antenna Geometry: To be used in the calculation of the elevation axis movement
  - Note: In this current implementation this information is not being used
- Encoder counts per degree: The number of encoder counts in the azimuth and elevation axis needed to move the antenna 1 degree
  - Note: The values in this code come directly from the original SRT software for the Cassi mount. It is not recommended to change this value unless a new model or calibration is available for these parameters.
- Azimuth and elevation axes tilt correction
- Site parameters: To define the location of the telescope (needed for source tracking functions)

File name: ParametersV01.py

Global Variables

VSRT

SRT observing mode, for use in the original SRT software. Values: 0 for single antenna, 2 for interferometer.

In []:
```
vsrt = 0.0
```

Comerr

Number of communication errors in the serial port.

In []:
```
comerr = 0
```

South

Azimuth orientation (south or north) Values: 0 antenna normally to north, 1 antenna normally to south.

In []:
```
south = 0
```

countperstep

Maximum number of encoder counts per movement step

In []:
```
countperstep = 50
```

Slew

Flag to indicate if the antenna is slewing until reaching the commanded position. Values: 0 if antenna is not moving, 1 if antenna is moving.

In []:
```
slew = 0
```

Antenna Limits

azlim1

Minimum azimuth limit, this is the azimuth at stow position.

azlim 2

Maximum Azimuth limit

In []:
```
azlim1 = 0.0
```

In []:
```
azlim2 = 355.0
```

ellim1

Minimum elevation limit, this is the elevation at stow position

ellim2

Maximum elevation limit

In []:
```
ellim1 = 8.0
```

In []:
```
ellim2 = 85.0
```

Antenna Geometry

The antenna geometry is used to calculate the movement of the elevation axis as encoder counts. The current control implementation is not using this geometry but a fixed convertion from encoder counts to degrees, but it has been include in the code for future implementations using this information.

Pushrod

Value: 1 for cassi mount, 0 for other type of mount. This variable is used in the original SRT software.

rod1

rod1 is the rigid arm length (not clear if in cm or inches)

rod2

rod2 is the distance from the pushrod upper joint to the elevation axis

rod3

rod3 is the the pushrod collar offset

rod4

rod4 is the pushrod angle at horizon

rod5

undefined in the SRT original software

In []:
```
#Antenna Geometry - needed for elevation calculus
pushrod = 1 #cassi mount, 0 for other kind of mount
rod1 = 14.25;      # rigid arm length
rod2 = 16.5;       # distance from pusrod upper joint to el axis
rod3 = 2.0;        # pushrod collar offset
rod4 =110.0;      # angle at horizon
rod5 =30.0;
```

lenzero

lenght of the distance between the extreme of the elevation axis to the pushrod upper joint, it is calculated bu the law of cosines

In []:
```
lenzero = rod1**2 + rod2**2 - 2.0 * rod1 * rod2 * math.cos((rod4 - ellim1
) * math.pi / 180.0) - rod3**2;
if (lenzero >= 0.0):
        lenzero = math.sqrt(lenzero);
else:
        lenzero = 0;
```

Encoder counts per degree

The encoder counts per degree is given in the original SRT software for the CASSI mount, there is no model available to calculate the scale.

The number of encoder counts per degree of movement in the azimuth axis.

elcounts_per_deg

The number of encoder counts per degree of movement in the elevation axis.

In [ ]:
```
# counts to degrees scale
azcounts_per_deg = 8.0 * 32.0 * 60.0 / (360.0 * 9.0); # default for CASSI

elcounts_per_deg = 52.0 * 27.0 / 120.0;
```

Stow position flags

azatstow

Indicates if the azimuth axis is at the stow position azlim1, by default the control assumes that the antenna is not at stow. values: 0 not at stow, 1 at stow

elatstow

Indicates if the elevation axis is at the stow position ellim1, by default the control assumes that the antenna is not at stow. values: 0 not at stow, 1 at stow

tostow

Indicates if the antenna is moving to stow position values: 0 not moving to stow, 1 moving to stow.

In [ ]:
```
azatstow = 0
elatstow = 0
tostow = 0
```

Antenna azimuth and elevation axes tilt Corrections

These are corrections due to azimuth and elevation axes tilt. Tilt is zero by default in other case azcor and elcor are calculated by 'antiltaz' and 'antilel' function in geom library for the SRT original SW, this library is not included in this current software version. As no tilt is measured no tilt corrections are included

azcor

Tilt correction for the azimuth axis

elcor

Tilt correction for the elevation axis

In [ ]:
```
## corrections due to azimuth and elevation axis tilt, tilt is zero by de
fault in other case azcor and elcor are calculated by antiltaz and antile
l function in geom library
## as no tilt is measured no tilt corrections are included
azcor = 0
elcor = 0
```

Antenna orientation and azimuth limits consitance verification

The parameters file includes a check of the azimuth limits defined in the file and the orientation of the antenna. The code is typed as written in the original code for the SRT control, however this has to be reviewed.

In [ ]:
```
#verifies azimuth limits and antenna orientation
if ((azlim2 > azlim1) & (azlim2 < 360.0)):
        south = 1  # normally South
else:
    south = 0 # North
    if azlim2 < 360.0:
                azlim2 = azlim2 + 360.0

#prints in the screen the values for the axis limits
print "azlim1 = "+ str(azlim1) + " azlim2 = "+ str(azlim2)
print "ellim1 = "+ str(ellim1) + " ellim2 = "+ str(ellim2)
```

Site Parameters

The site parameters consider the geographical coordinates of the place where the antenna is located. These parameters are used to feed the pyephem library to obtain the ephemeris of sources to be observed with the telescope.

In [ ]:
```
# Local coordinates (Calama)
place = 'calama'
lat = '-22.5'
lon = '-68.9'
elevation = 2277
```