

**NAME**

AXAFCoords – transform between various coordinate systems

**SYNOPSIS**

```

dofile ( '/proj/axaf/simul/lib/lua/AXAFCoords.lua' )

el, az = osac_polar_2_osac_elaz( theta, phi )
theta, phi = osac_elaz_2_osac_polar( el, az )

theta, phi = osac_polar_2_HSC11( theta, phi )
theta, phi = HSC11_2_osac_polar( theta, phi )

el, az = pitchyaw_2_osac_elaz( pitch, yaw )

x, y = osac_elaz_2_xy( el, az, z )

theta, phi = osac_polar_2_raygen_polar( theta, phi )

theta, phi = raygen_polar_to_MSC( theta, phi )

theta, phi = MSC_to_raygen_polar( theta, phi )

el, az = raygen_polar_2_raygen_elaz( theta, phi )
theta, phi = raygen_elaz_2_raygen_polar( el, az )

```

**DESCRIPTION**

The **AXAFCoords** library provides routines to convert between various coordinate systems. Currently, it primarily handles source position coordinates.

**CONSTANTS**

```

PI    PI = 3.14159265358979323846

sec2rad
    factor to convert from seconds of arc to radians

min2rad
    factor to convert from minutes of arc to radians

deg2rad
    factor to convert from degrees to radians

rad2deg
    factor to convert from radians to degrees

```

**FUNCTIONS**

```

osac_polar_2_osac_elaz
    Convert from OSAC polar coordinates to OSAC elevation and azimuth. All angles are in radians.
    Input angles are reduced such that  $0 \leq \phi < 2\pi$  and  $0 \leq \theta \leq \pi/2$ 

osac_polar_2_raygen_polar
    Convert from OSAC polar coordinates (which indicate the direction that the ray is travelling to) to
    raygen polar coordinates, which indicate the direction the ray is travelling from. All angles are
    in radians.

osac_elaz_2_osac_polar
    Convert from OSAC elevation and azimuth to OSAC polar coordinates. All angles are in radians.
    Input angles are reduced to be  $0 \leq \text{angle} \leq \pi/2$ .

osac_polar_2_HSC11
    Convert from OSAC polar coordinates to HRMA Left Handed Spherical Coordinates
    (AXAF-HSC-1.1). All angles are in radians.

```

HSC11\_2\_osac\_polar

convert from AXAF-HSC-1.1 to OSAC polar coordinates. All angles are in radians.

raygen\_polar\_to\_MSC

Convert from **raygen** polar coordinates to Mirror Spherical Coordinates. All angles are in radians.

MSC\_to\_osac\_polar

convert from Mirror Spherical Coordinates to **raygen** polar coordinates. All angles are in radians.

pitchyaw\_2\_osac\_elaz

convert from XRCF pitch and yaw to OSAC elevation and azimuth. Pitch and Yaw are in minutes of arc; the output angles are in radians.

osac\_elaz\_2\_xy( \$el, \$az, \$z )

convert from OSAC elevation and azimuth to OSAC X and Y at a particular OSAC Z. All angles are in radians.

raygen\_elaz\_2\_raygen\_polar

( \$theta, \$phi ) = raygen\_elaz\_2\_raygen\_polar( \$el, \$az );

Convert from **raygen** elevation and azimuth to **raygen** polar coordinates. All angles are in radians. Input angles are reduced to be  $0 \leq \text{angle} \leq \pi/2$ .

raygen\_polar\_2\_raygen\_elaz

( \$el, \$az ) = raygen\_polar\_2\_raygen\_elaz( \$theta, \$phi );

Convert from **raygen** polar coordinates to **raygen** elevation and azimuth. All angles are in radians. Input angles are reduced such that  $0 \leq \phi < 2\pi$  and  $0 \leq \theta \leq \pi/2$

## Author

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