

Reentryparameters 4.5.1

De Wiki

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```
public class UsingReentryParameters {

    public static void main(String[] args) throws PatriusException,
    IOException, ParseException, URISyntaxException {

        // Patrius Dataset initialization (needed for example to get the UTC
time
        PatriusDataset.addResourcesFromPatriusDataset() ;

        // Constants that will be used for conversions
        final double REQ = Constants.WGS84_EARTH_EQUATORIAL_RADIUS;
        final double APLA = Constants.WGS84_EARTH_FLATTENING;
        final double MU = Constants.WGS84_EARTH_MU;

        // Initialization of keplerian parameters
        final double dga = REQ + 250.e3;
        final double exc = 0.;
        final double inc = FastMath.toRadians(45.);
        final double gom = FastMath.toRadians(0.);
        final double pom = FastMath.toRadians(0.);
        final double ano = FastMath.toRadians(90.);
        final KeplerianParameters kep = new KeplerianParameters(dga, exc,
inc, pom, gom, ano, PositionAngle.MEAN, MU);

        // Corresponding "absolute" reentry parameters
        final ReentryParameters renAbs = kep.getReentryParameters(REQ, 0.);

        System.out.println("ABSOLUTE GEOCENTRIC PARAMETERS ...");
        System.out.println("alt = "+renAbs.getAltitude()/1000.+ " km");
        System.out.println("lat =
"+FastMath.toDegrees(renAbs.getLatitude())+" deg");
        System.out.println("lon =
"+FastMath.toDegrees(renAbs.getLongitude())+" deg");
        System.out.println("vit = "+renAbs.getVelocity()+" m/s");
        System.out.println("pen = "+FastMath.toDegrees(renAbs.getSlope())+"
deg");
        System.out.println("azi = "+FastMath.toDegrees(renAbs.getAzimuth())+"
deg");

        // Recovery of the UTC time scale using a "factory" (not to duplicate
such unique object)
        final TimeScale TUC = TimeScalesFactory.getUTC();

        // Date of the orbit given in UTC time scale)
```

```

    final AbsoluteDate date = new AbsoluteDate("2010-01-01T12:00:00.000",
TUC);

    // Getting frames
    final Frame GCRF = FramesFactory.getGCRF();
    final Frame ITRF = FramesFactory.getITRF();
    final Transform transform = GCRF.getTransformTo(ITRF, date);

    // Getting PV coordinates, considering them in GCRF frame
    final PVCoordinates pvGCRF =
kep.getCartesianParameters().getPVCoordinates();
    // Same PV coordinates but defined in a rotative frame ...
    final PVCoordinates pvITRF =
transform.transformPVCoordinates(pvGCRF);
    // Getting corresponding (relative) cartesian parameters
    final CartesianParameters carRel = new CartesianParameters(pvITRF,
MU);
    // Getting relative geocentric reentry parameters
    final ReentryParameters relRen = carRel.getReentryParameters(REQ,
0.);

    System.out.println("\nRELATIVE GEOCENTRIC REENTRY PARAMETERS ...");
    System.out.println("alt = "+relRen.getAltitude()/1000.+ " km");
    System.out.println("lat =
"+FastMath.toDegrees(relRen.getLatitude())+" deg");
    System.out.println("lon =
"+FastMath.toDegrees(relRen.getLongitude())+" deg");
    System.out.println("vit = "+relRen.getVelocity()+" m/s");
    System.out.println("pen = "+FastMath.toDegrees(relRen.getSlope())+"
deg");
    System.out.println("azi = "+FastMath.toDegrees(relRen.getAzimuth())+"
deg");

    // Getting relative geocentric reentry parameters
    final ReentryParameters relRenGeod = carRel.getReentryParameters(REQ,
APLA);

    System.out.println("\nRELATIVE GEODETIC REENTRY PARAMETERS ...");
    System.out.println("alt = "+relRenGeod.getAltitude()/1000.+ " km");
    System.out.println("lat =
"+FastMath.toDegrees(relRenGeod.getLatitude())+" deg");
    System.out.println("lon =
"+FastMath.toDegrees(relRenGeod.getLongitude())+" deg");
    System.out.println("vit = "+relRenGeod.getVelocity()+" m/s");
    System.out.println("pen =
"+FastMath.toDegrees(relRenGeod.getSlope())+" deg");
    System.out.println("azi =
"+FastMath.toDegrees(relRenGeod.getAzimuth())+" deg");

}

```

}

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