

CreateKeplerianOrbitUsingParameters 4.4

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```
public class SimpleKeplerianOrbitUsingParameters {

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

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

        // 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 the frame with wich will defined the orbit parameters
// As for time scale, we will use also a "factory".
        final Frame GCRF = FramesFactory.getGCRF();

        // Creation of a keplerian orbit
        final double sma = 7200.e+3;
        final double exc = 0.01;
        final double inc = FastMath.toRadians(98.);
        final double pa = FastMath.toRadians(0.);
        final double raan = FastMath.toRadians(0.);
        final double anm = FastMath.toRadians(0.);
        final double MU = Constants.WGS84_EARTH_MU;

        // We use firstly an orbital parameters object
        final KeplerianParameters kep = new KeplerianParameters(sma, exc,
inc, pa, raan, anm, PositionAngle.MEAN, MU);

        // Then, we create the orbit
        final KeplerianOrbit iniOrbit = new KeplerianOrbit(kep, GCRF, date);

        // Printing the Keplerian period
        System.out.println("Tper = "+iniOrbit.getKeplerianPeriod()+" s");

        // We may use other set of parameters ...
        final double per = sma*(1.-exc);
        final double apo = sma*(1.+exc);
        final ApsisRadiusParameters aps = new ApsisRadiusParameters(per, apo,
```

```
inc, pa, raan, anm, PositionAngle.MEAN, MU);

    // Then, we create again the orbit
    final KeplerianOrbit sameOrbit = new KeplerianOrbit(aps, GCRF, date);

    // We compare each PV coordinates
    final PVCoordinates pvOrbit = iniOrbit.getPVCoordinates();
    final PVCoordinates pvSameOrbit = sameOrbit.getPVCoordinates();

    System.out.println();
    System.out.println("Is both orbits equals :
"+pvSameOrbit.getPosition().equals(pvOrbit.getPosition()));
    System.out.println("Is both orbits equals :
"+pvSameOrbit.getVelocity().equals(pvOrbit.getVelocity()));

    }

}
```

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