NumericalpropagationWithDrag 4.1

NumericalpropagationWithDrag 4.1

```java
public class NumericalPropagationWithDrag {

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

        // 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();

        // Initial orbit
        final double sma = 6600.e+3;
        final double exc = 0.;
        final double per = sma*(1.-exc);
        final double apo = sma*(1.+exc);
        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;

        final ApsisRadiusParameters par = new ApsisRadiusParameters(per, apo,
inc, pa, raan, anm, PositionAngle.MEAN, MU);
        final Orbit iniOrbit = new ApsisOrbit(par, GCRF, date);

        // Mass model using an Assembly

        final AssemblyBuilder builder = new AssemblyBuilder();

        // Initial mass (mandatory to take into account mass for atmospheric
force computation)
        final double dryMass = 100.;
        builder.addMainPart("MAIN");
```

```
        builder.addProperty(new MassProperty(dryMass), "MAIN");

//SPECIFIC
        // Adding the AeroGSphere property for drag only
        final double cd = 2.0;
        final double sref = 10.;
        builder.addProperty(new AeroSphereProperty(new Parameter("", sref),
cd), "MAIN");
//SPECIFIC

        final Assembly assembly = builder.returnAssembly();
        final MassProvider mm = new MassModel(assembly);

        // We create a spacecratftstate
        final SpacecraftState iniState = new SpacecraftState(iniOrbit, mm);

        // Initialization of the Runge Kutta integrator with a 2 s step
        final double pasRk = 2.;
        final FirstOrderIntegrator integrator = new
ClassicalRungeKuttaIntegrator(pasRk);

        // Initialization of the propagator
        final NumericalPropagator propagator = new
NumericalPropagator(integrator);
        propagator.resetInitialState(iniState);

        // Adding additional state (change name add to set for V3.3)
        propagator.setMassProviderEquation(mm);

        // Forcing integration using cartesian equations
        propagator.setOrbitType(OrbitType.CARTESIAN);

//SPECIFIC
        // Definition of the Earth ellipsoid for later atmospheric density
computation
        final Frame ITRF = FramesFactory.getITRF();
        final double AE = Constants.WGS84_EARTH_EQUATORIAL_RADIUS;
        final GeometricBodyShape EARTH = new ExtendedOneAxisEllipsoid(AE,
Constants.WGS84_EARTH_FLATTENING, ITRF, "EARTH");

        // Adding atmospheric forces using US76 model
        final Atmosphere atmosphere = new US76(EARTH);
        final AeroModel dragModel = new AeroModel(assembly);
        final ForceModel atm = new DragForce(atmosphere, dragModel);
        propagator.addForceModel(atm);
//SPECIFIC

        // Propagating 5 periods
        final double dt = 5.*iniOrbit.getKeplerianPeriod();
        final AbsoluteDate finalDate = date.shiftedBy(dt);
        final SpacecraftState finalState = propagator.propagate(finalDate);
```

```java
        final Orbit finalOrbit = finalState.getOrbit();

        // Printing new date and semi major axis
        System.out.println();
        System.out.println("Initial semi major axis =
"+iniOrbit.getA()/1000.+" km");
        System.out.println("New date = "+finalOrbit.getDate().toString(TUC)+"
deg");
        System.out.println("Final semi major axis =
"+finalOrbit.getA()/1000.+" km");
        // Printing mass
        System.out.println();
        System.out.println("Mass = "+finalState.getMass("MAIN")+" kg");

    }

}
```

Récupérée de
« http://patrius.cnes.fr/index.php?title=NumericalpropagationWithDrag_4.1&oldid=1855 »

Menu de navigation

Outils personnels

- [3.143.235.104](#)
- [Discussion avec cette adresse IP](#)
- [Créer un compte](#)
- [Se connecter](#)

Espaces de noms

- [Page](#)
- [Discussion](#)

Variantes

Affichages

- [Lire](#)
- [Voir le texte source](#)
- [Historique](#)
- [Exporter en PDF](#)

Plus

Rechercher

PATRIUS

- [Welcome](#)

Evolutions

- [Main differences between V4.15 and V4.14](#)
- [Main differences between V4.14 and V4.13](#)
- [Main differences between V4.13 and V4.12](#)
- [Main differences between V4.12 and V4.11](#)
- [Main differences between V4.11 and V4.10](#)
- [Main differences between V4.10 and V4.9](#)
- [Main differences between V4.9 and V4.8](#)
- [Main differences between V4.8 and V4.7](#)
- [Main differences between V4.7 and V4.6.1](#)
- [Main differences between V4.6.1 and V4.5.1](#)
- [Main differences between V4.5.1 and V4.4](#)
- [Main differences between V4.4 and V4.3](#)
- [Main differences between V4.3 and V4.2](#)
- [Main differences between V4.2 and V4.1.1](#)
- [Main differences between V4.1.1 and V4.1](#)
- [Main differences between V4.1 and V4.0](#)
- [Main differences between V4.0 and V3.4.1](#)

User Manual

- [User Manual 4.15](#)
- [User Manual 4.14](#)
- [User Manual 4.13](#)
- [User Manual 4.12](#)
- [User Manual 4.11](#)
- [User Manual 4.10](#)
- [User Manual 4.9](#)
- [User Manual 4.8](#)
- [User Manual 4.7](#)
- [User Manual 4.6.1](#)
- [User Manual 4.5.1](#)
- [User Manual 4.4](#)
- [User Manual 4.3](#)
- [User Manual 4.2](#)
- [User Manual 4.1](#)
- [User Manual 4.0](#)

* [User Manual 3.4.1](#)
* [User Manual 3.3](#)

Tutorials

* [Tutorials 4.15](#)
* [Tutorials 4.14](#)
* [Tutorials 4.13.5](#)
* [Tutorials 4.12.1](#)
* [Tutorials 4.8.1](#)
* [Tutorials 4.5.1](#)
* [Tutorials 4.4](#)
* [Tutorials 4.1](#)
* [Tutorials 4.0](#)

Links

* [CNES freeware server](#)

Navigation

* [Accueil](#)
* [Modifications récentes](#)
* [Page au hasard](#)
* [Aide](#)

Outils

* [Pages liées](#)
* [Suivi des pages liées](#)
* [Pages spéciales](#)
* [Adresse de cette version](#)
* [Information sur la page](#)
* [Citer cette page](#)

* Dernière modification de cette page le 18 décembre 2018 à 10:30.

* [Politique de confidentialité](#)
* [À propos de Wiki](#)
* [Avertissements](#)

*