

NumericalPropagationWithContinuousManeuver 4.5.1

De Wiki

Aller à : [navigation](#), [rechercher](#)

[NumericalPropagationWithContinuousManeuver 4.5.1](#)

```
public class NumericalPropagationWithContinuousManeuver {

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

        // Initial orbit
        final double sma = 7200.e+3;
        final double exc = 0.01;
        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);

//SPECIFIC
        // Creating a mass model (see also specific example)
        final AssemblyBuilder builder = new AssemblyBuilder();

        // Main part
        final double iniMass = 900.;
```

```

builder.addMainPart("MAIN");
builder.addProperty(new MassProperty(iniMass), "MAIN");

// Tank part (ergols mass)
final double ergolsMass = 100.;
final TankProperty tank = new TankProperty(ergolsMass);
builder.addPart("TANK", "MAIN", Transform.IDENTITY);
builder.addProperty(tank, "TANK");

// Engine part
final double isp = 300.;
final double thrust = 400.;
final PropulsiveProperty prop = new PropulsiveProperty(thrust, isp);
// au lieu de new PropulsiveProperty("PROP", thrust, isp);
builder.addPart("PROP", "MAIN", Transform.IDENTITY);
builder.addProperty(prop, "PROP");

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

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

// 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);

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

//SPECIFIC
// Duration of the maneuver to get a 20 m/S boost
final double G0 = 9.80665;
final double duration = G0*isp*iniMass*(1. -
FastMath.exp(-20/(G0*isp)))/thrust;
// Start and end thrust events
final EventDetector eventStart = new
DateDetector(date.shiftedBy(10.));
final EventDetector eventEnd = new
DateDetector(date.shiftedBy(10.+duration));
// Creation of the continuous thrust maneuver
final Vector3D direction = new Vector3D(1., 0., 0.);
final ContinuousThrustManeuver man = new
ContinuousThrustManeuver(eventStart, eventEnd, prop, direction, mm, tank);

```

```

// Adding a continuous thrust maneuver
propagator.addForceModel(man);
// Adding additional state (change name add to set for V3.3)
propagator.setMassProviderEquation(mm);

// Adding an attitude law (or attitude sequence : mandatory)
final AttitudeLaw attitudeLaw = new LofOffset(LOFType.TNW,
RotationOrder.ZYX, 0., 0., 0.);
propagator.setAttitudeProvider(attitudeLaw);

//SPECIFIC

// Propagating 100s
final double dt = 100.;
final AbsoluteDate finalDate = date.shiftedBy(dt);
final SpacecraftState finalState = propagator.propagate(finalDate);
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("Dry Mass = "+finalState.getMass("MAIN")+ " kg");
System.out.println("Ergols Mass = "+finalState.getMass("TANK")+
kg");
}
}

```

Récupérée de

«

http://patrius.cnes.fr/index.php?title=NumericalPropagationWithContinuousManeuver_4.5.1&oldid=2705 »

Menu de navigation

Outils personnels

- [3.14.246.52](#)
- [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 17 août 2020 à 09:10.
- [Politique de confidentialité](#)
 - [À propos de Wiki](#)
 - [Avertissements](#)
 - 