

NumericalPropagationWithManeuverSequence 4.1

De Wiki

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

[NumericalPropagationWithManeuverSequence 4.1](#)

```
public class NumericalPropagationWithManeuverSequence {

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

        // 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);

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
// Event corresponding to the criteria to trigger the impulsive
maneuver
final EventDetector event = new DateDetector(date);
// Creation of the impulsive maneuver
final Vector3D deltaV = new Vector3D(20., 0., 0.);
final ImpulseManeuver imp = new ImpulseManeuver(event, deltaV, prop,
mm, tank, LOFType.TNW);

// Duration of the maneuver to reach the initial semi major axis
final double duration = 51.03781404091;
// Creation of the continuous thrust maneuver
final AbsoluteDate startDate =
date.shiftedBy(0.5*(iniOrbit.getKeplerianPeriod()-duration));
final EventDetector eventStart = new DateDetector(startDate);

```

```

        final EventDetector eventEnd = new
DateDetector(startDate.shiftedBy(duration));
        final Vector3D direction = new Vector3D(-1., 0., 0.);
        final ContinuousThrustManeuver man = new
ContinuousThrustManeuver(eventStart, eventEnd, prop, direction, mm, tank);

        // Creation of the sequence of maneuver
ManeuversSequence seq = new ManeuversSequence(0., 0.);
        seq.add(imp);
        seq.add(man);

        // Adding the maneuver sequence to the propagator
seq.applyTo(propagator);
        // 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 = iniOrbit.getKeplerianPeriod();
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=NumericalPropagationWithManeuverSequence_4.1&oldid=1860 »

Menu de navigation

Outils personnels

- [18.118.140.78](#)
- [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 10:33.

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

- 