

NumericalPropagationWithFixedStepHandler 4.1

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```
public class NumericalPropagationWithFixedStepHandler {  
  
    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);  
  
        // We create a spacecraftstate  
        final SpacecraftState iniState = new SpacecraftState(iniOrbit);  
  
        // 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
        // Creation of a fixed step handler
        final ArrayList<SpacecraftState> listOfStates = new
ArrayList<SpacecraftState>();
        PatriusFixedStepHandler myStepHandler = new PatriusFixedStepHandler()
{
            private static final long serialVersionUID = 1L;
            public void init(SpacecraftState s0, AbsoluteDate t) {
                // Nothing to do ...
            }
            public void handleStep(SpacecraftState currentState, boolean
isLast)
                throws PropagationException {
                // Adding S/C to the list
                listOfStates.add(currentState);
            }
        };
        // The handler frequency is set to 10S
        propagator.setMasterMode(10., myStepHandler);
//SPECIFIC

        // Propagating 100s
        final double dt = 101.;
        final AbsoluteDate finalDate = date.shiftedBy(dt);
        final SpacecraftState finalState = propagator.propagate(finalDate);

        // Display data at each step
        System.out.println(iniState.getDate().toString(TUC)+" ; LV =
"+FastMath.toDegrees(iniState.getLv()+ " deg");
        for (SpacecraftState sc : listOfStates) {
            System.out.println(sc.getDate().toString(TUC)+" ; LV =
"+FastMath.toDegrees(sc.getLv()+ " deg");
        }
        System.out.println(finalState.getDate().toString(TUC)+" ; LV =
"+FastMath.toDegrees(finalState.getLv()+ " deg");

    }

}

```

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