UsingVehicleClassComplete 4.1

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```
public class UsingVehicleClassComplete {

    private enum TYPE { EMPTY, COMPLETE };

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

        // Dry mass
        final double dryMass = 1000.;
        final MassProperty dryMassProperty = new MassProperty(dryMass);

        // Shape
        final double lref = 1.0;
        final Sphere sphere = new Sphere(lref);
        final RightParallelepiped solarPanels = new RightParallelepiped(1.,
0.1, 0.1); // To be replaced by addSolarPanels ?
        VehicleSurfaceModel vehicleRefSurfacewithoutSolarPanels = new
VehicleSurfaceModel(sphere, null);
        VehicleSurfaceModel vehicleRefSurfaceWithSolarpanels = new
VehicleSurfaceModel(sphere, solarPanels);
        VehicleSurfaceModel vehicleRefSurface =
vehicleRefSurfacewithoutSolarPanels;

        // Aerodynamic properties
        final double cd = 2.;
        final double cl = 2.;
        final AerodynamicProperties aerodynamicProperties = new
AerodynamicProperties(vehicleRefSurface, cd, cl);

         // Radiative properties
        final double ka = 1.0;
        final double ks = 0.0;
        final double kd = 0.0;
        final double kaIr = 1.0;
        final double ksIr = 0.0;
        final double kdIr = 0.0;
        final RadiativeProperty radiativeProperty = new RadiativeProperty(ka,
ks, kd);
        final RadiativeIRProperty radiativeIRProperty =
                new RadiativeIRProperty(kaIr, ksIr, kdIr);
        final RadiativeProperties radiativeProperties =
                new RadiativeProperties(radiativeProperty,
radiativeIRProperty, vehicleRefSurface);

        // Propulsive properties
        // Tanks
        final double merg1 = 100.;
        final TankProperty tank1 = new TankProperty(merg1);
        tank1.setPartName("TANK1");
        final double merg2 = 200.;
        final TankProperty tank2 = new TankProperty(merg2);
        tank2.setPartName("TANK2");
        final ArrayList<TankProperty> tanksList = new
ArrayList<TankProperty>();
        tanksList.add(tank1);
        tanksList.add(tank2);

        // Engine
        final double thrust = 400.;
        final double isp = 320.;
        final PropulsiveProperty engine = new PropulsiveProperty(thrust,
isp);
        engine.setPartName("PROP");
        final ArrayList<PropulsiveProperty> enginesList = new
ArrayList<PropulsiveProperty>();
        enginesList.add(engine);

        for ( TYPE type : TYPE.values() ) {

            Vehicle veh = null;

            if ( type == TYPE.EMPTY ) {

                // Case with an initial empty constructor
                System.out.println("\nCASE OF EMPTY CONSTRUCTOR");
                veh = new Vehicle();
                veh.setDryMass(dryMass);
                veh.setMainShape(sphere);
                veh.addSolarPanel(Vector3D.PLUS_I, 1.);
                veh.setAerodynamicsProperties(cd, cl);
                veh.setRadiativeProperties(ka, ks, kd, kaIr, ksIr, kdIr);
                veh.addTank(tank1.getPartName(), tank1);
                veh.addTank(tank2.getPartName(), tank2);
                veh.addEngine(engine.getPartName(), engine);

            } else {

                // Case with a complete constructor
                System.out.println("\nCASE OF COMPLETE CONSTRUCTOR");
                veh = new Vehicle(vehicleRefSurface, null, dryMassProperty,
aerodynamicProperties, radiativeProperties, enginesList, tanksList);
                //veh.setMainShape(sphere);

            }
            // Getting the corresponding assembly
            final Assembly assembly =
veh.createAssembly(FramesFactory.getCIRF());

            // Getting the corresponding mass model (useful for propagation,
maneuvres, ...)
            final MassProvider mm = new MassModel(assembly);

            // Getting main characteristics
            System.out.println("\nMAIN PROPERTIES");
            System.out.println("Name of the main part: " +
assembly.getMainPart().getName());
            System.out.println("Total mass: " + mm.getTotalMass());

            // Getting propulsive characteristics
            System.out.println("\nPROPULSIVE PROPERTIES");
            for (int i = 0; i < veh.getEnginesList().size(); i++) {

System.out.println(veh.getEnginesList().get(i).getPartName());
                System.out.println("Thrust =
"+veh.getEnginesList().get(i).getThrust(null)+" N");
                System.out.println("Isp =
"+veh.getEnginesList().get(i).getIsp(null)+ "s");
            }
            for (int i = 0; i < veh.getTanksList().size(); i++) {
                System.out.println(veh.getTanksList().get(i).getPartName()+":
"+veh.getTanksList().get(i).getMass()+" kg");
            }

            // Getting aerodynamics characteristics
            System.out.println("\nAERODYNAMIC PROPERTIES");
            final Vector3D xDir = new Vector3D(1., 0., 0.);
            final Vector3D yDir = new Vector3D(0., 1., 0.);
            final Vector3D zDir = new Vector3D(0., 0., 1.);
            System.out.println("SX =
"+veh.getMainShape().getCrossSection(xDir)+" m2");
            System.out.println("SX =
"+veh.getAerodynamicProperties().getVehicleSurfaceModel().getMainPartShape().
getCrossSection(xDir)+" m2");
            System.out.println("SY =
"+veh.getAerodynamicProperties().getVehicleSurfaceModel().getMainPartShape().
getCrossSection(yDir)+" m2");
            System.out.println("SZ =
"+veh.getAerodynamicProperties().getVehicleSurfaceModel().getMainPartShape().
getCrossSection(zDir)+" m2");
            System.out.println("CD =
"+veh.getAerodynamicProperties().getConstantDragCoef());

            System.out.println("\nRADIATIVE PROPERTIES");
            System.out.println("SX =
"+veh.getRadiativeProperties().getVehicleSurfaceModel().getMainPartShape().
getCrossSection(xDir)+" m2");
            System.out.println("SY =
"+veh.getRadiativeProperties().getVehicleSurfaceModel().getMainPartShape().
getCrossSection(yDir)+" m2");
            System.out.println("SZ =
"+veh.getRadiativeProperties().getVehicleSurfaceModel().getMainPartShape().
getCrossSection(zDir)+" m2");
            System.out.println("KA =
"+veh.getRadiativeProperties().getRadiativeProperty().getAbsorptionRatio().
getValue());
            System.out.println("KD =
"+veh.getRadiativeProperties().getRadiativeProperty().
getDiffuseReflectionRatio().getValue());
            System.out.println("KS =
"+veh.getRadiativeProperties().getRadiativeProperty().
getSpecularReflectionRatio().getValue());
            System.out.println("KAI =
"+veh.getRadiativeProperties().getRadiativeIRProperty().getAbsorptionCoef().
getValue());
            System.out.println("KDI =
"+veh.getRadiativeProperties().getRadiativeIRProperty().
getDiffuseReflectionCoef().getValue());
            System.out.println("KSI =
"+veh.getRadiativeProperties().getRadiativeIRProperty().
getSpecularReflectionCoef().getValue());

        }


    }



}
```

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