**Hohmann transfer**

Our spacecraft has a semi major axis of 7000 km and is in a circular orbit. We wish to put it at a 20000 km semi major axis circular orbit. Calculate the total amount of Required to transfer to the new orbit using a Hohmann transfer.

// initial Speed Orbit

Variable vInitial = sqrt(Earth.Mu \* ( (2/InitialRadius) - (1/InitialRadius) ));

// Semi-Major Axis of the transfer trajectory

Variable SemiMajorTransfer = (FinalRadius + InitialRadius)/2;

// Velocity at periapsis of the transfer trajectory

Variable vTransfPeri = sqrt(Earth.Mu \* ( (2/InitialRadius) - (1/SemiMajorTransfer) ));

// Delta V of the first maneuver

Variable dV1 = vTransfPeri - vInitial;

// Velocity at apoapsis of the transfer trajectory

Variable vTransfApog = sqrt(Earth.Mu \* ( (2/FinalRadius) - (1/SemiMajorTransfer) ));

// Velocity of the final orbit

Variable vFinal = sqrt(Earth.Mu \* ( (2/FinalRadius) - (1/FinalRadius) ));

// Delta V of the second Maneuver

Variable dV2 = vFinal - vTransfApog;

// Total Delta V required

Variable totalDV = dV1 + dV2;

// Assigns the InitialRadius to the spacecraft

// to ensure the Spacecraft SMA is the same as the one the user defined

Spacecraft1.A = InitialRadius;

// Changes color of SpaceCraft tail

Spacecraft1.Color = ColorTools.Yellow;

// Assigns the calculated delta v value to the Impulsive Burn

ImpulsiveBurn1.BurnDirection[0] = dV1;

Maneuver Spacecraft1 using ImpulsiveBurn1;

// Steps the Spacecraft to apoapsis and visualizes the Spacecraft

WhileStepping Spacecraft1 to (Spacecraft1.OrbitApoapsis);

Update ViewWindow1;

End;

// Changes the color of SpaceCraft tail again

Spacecraft1.Color = ColorTools.Lime;

// Sets the calculated delta v to the Impulsive Burn

ImpulsiveBurn2.BurnDirection[0] = dV2;

Maneuver Spacecraft1 using ImpulsiveBurn2;

// Reports the delta v values

Report dV1, dV2, totalDV;