

Home Work #2

Ali BaniAsad 401209244

November 13, 2022

1 Question 1

The space shuttle weighs approximately 12.5 tons, whose thrusters can simultaneously produce a total thrust of 53400 Newtons for orbital maneuvers. Assuming that the shuttle is initially in a 300 Km (altitude) circular Earth orbit, it is desired to use a single impulse to transfer the shuttle to a 250x300 Km elliptical orbit.

1.1 part a

$$h = \sqrt{2\mu} \sqrt{\frac{r_a r_p}{r_a + r_p}}$$

$$v = \frac{h}{r}$$

First orbit (circular):

$$r = 6678$$

For first circular orbit $r_a = r_p$.

$$h = 51593 \rightarrow v = 7.7258_{km/sec}$$

Second orbit (elliptical):

$$r_p = 6628, \quad r_a = 6678$$

$$h = 51496 \rightarrow v_a = 7.7113_{km/sec}$$

$$\Delta v = v_a - v = 0.0145_{km/sec}$$

Contents

1	Question 1	1
1.1	part a	1

List of Figures

List of Tables