



Astronomy Club, IITK  
SnT Summer Project  
**Blast Off**  
Assignment 4

Submission Deadline: 23:59:59, 26/06/2022

**Try to attempt all the questions**

- Calculate the  $\Delta v$  required to achieve a Hohmann transfer from Geostationary orbit (Altitude: 35,800 km) to:
  - Low Earth Orbit (LEO) - 400 km
  - Graveyard Orbit - 36,050 km

Based on the calculations, which transfer would be preferable to dispose off a decommissioned satellite?

- Numerically compute the location of the Lagrange points  $L_1$ ,  $L_2$  and  $L_3$  using dynamical principles, as discussed in the session, and compare it with the following results ( $M_1 > M_2$ ):
  - $L_1 = (R[1 - (\frac{M_2/M_1}{3})^{1/3}], 0)$
  - $L_2 = (R[1 + (\frac{M_2/M_1}{3})^{1/3}], 0)$
  - $L_3 = (-R[1 + \frac{5}{12} \frac{M_2}{M_1}], 0)$

Find out the location of the  $L_1$ ,  $L_2$  and  $L_3$  for Sun-Earth system, using the relevant data as given below:

- $M_S = 1.989 \times 10^{30} \text{ kg}$
- $M_E = 5.972 \times 10^{24} \text{ kg}$
- $R_{SE} = 1.5 \times 10^{11} \text{ m}$

- What do you make of the figure given below?

