1. A particle moves in a central force field given by the potential

\[ V(r) = -k \frac{e^{-ar}}{r} , \]

where \( k > 0 \) and \( a > 0 \) are constants. Write down the EoM for this system. Use 1D plots to discuss the nature of the motion qualitatively. Are circular orbits possible? If yes, derive an equation for \( r_0 \), the radius of the circular orbit.

2. Goldstein Ch. 3, Ex. 3.11

3. Goldstein Ch. 3, Ex. 3.14

4. Goldstein Ch. 3, Ex. 3.20 a, b