

1 Center of Mass for Two Uncoupled Particles

(Straightforward) Purpose: Discover that a system of two masses can be a central force system even when they are not interacting at all. Practice with center-of-mass coordinates.

Consider two particles of equal mass m . The forces on the particles are $\vec{F}_1 = 0$ and $\vec{F}_2 = F_0\hat{x}$. If the particles are initially at rest at the origin, find the position, velocity, and acceleration of the center of mass as functions of time. Solve this problem in two ways,

- with theorems about the center of mass motion,
- without theorems about the center of mass motion.
- Write a short description comparing the two solutions.