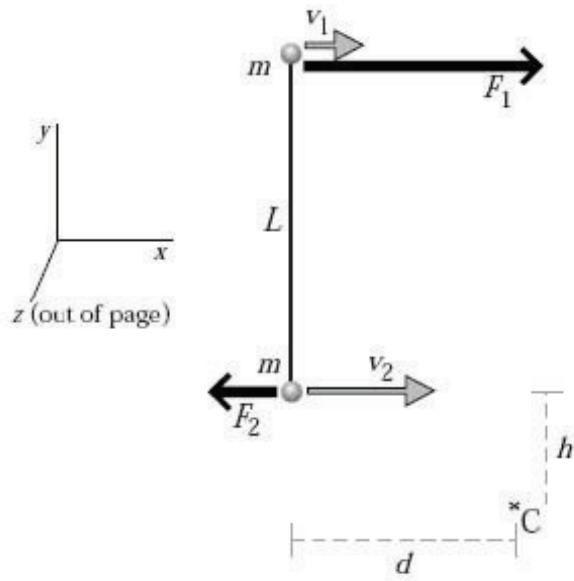Hand-Graded part of exam 3

Two small objects each of mass *m* are connected by a lightweight rod of length *L*. At a particular instant they have velocities as shown and are subjected to external forces as shown. The system is moving in outer space.

In the following questions involving vectors, give components along the axes shown.

(a) What is the total (linear) momentum $\vec{P}_{total}$ of this system?

(b) What is the velocity $\vec{v}_{CM}$ of the center of mass?

(c) What is the total angular momentum $\vec{L}_{total,C}$ of the system relative to point C?

(d) What is the translational angular momentum $\vec{L}_{trans,C}$ of the system relative to point C?

(e) What is the rotational angular momentum $\vec{L}_{rot}$ of the system?

After a short time interval Δ*t*,

(f) What is the total (linear) momentum $\vec{P}_{total}$ of the system?

(g) What is the total angular momentum $\vec{L}_{total,C}$ of the system?