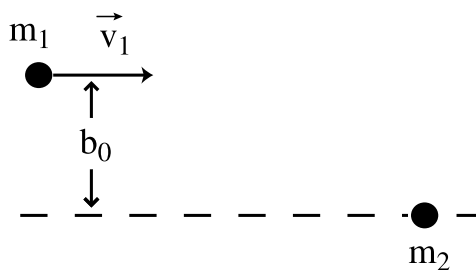


Reading: Chapter 4

Problems:

1. From the August '03 Subject Exam:

Two particles of masses m_1 and m_2 ($m_1 \neq m_2$) collide. The initial velocity of particle 1 is \vec{v}_1 , while the particle 2 is initially at rest. The initial impact parameter is b_0 , as shown.



The particles interact through a repulsive potential $V = V_0/|\vec{r}_1 - \vec{r}_2|^4$. (a) Find the magnitude of net angular momentum and the net energy in the *center of mass*, in terms of provided quantities. (b) Obtain an equation for the rate of change of the separation $r = |\vec{r}_1 - \vec{r}_2|$ in time. Find the distance of closest approach between the particles. (c) Consider a situation where b_0 is unknown but the magnitude v_1^f of the final velocity of particle 1 has been measured in the laboratory frame. Find the angle β between the final laboratory velocities of particles 1 and 2, given v_1^f . (Use conservation laws whenever possible.)

2. Goldstein, Problem 4-5.
3. Goldstein, Problem 4-6.
4. Goldstein, Problem 4-10.
5. Goldstein, Problem 4-14.