

(Due Friday, Oct. 23)

ProblemsSolve the following problems from Goldstein, 3rd Ed.

- (3.31) Examine the scattering produced by a repulsive central force $f = kr^{-3}$.
 - Show that the differential cross section is given by

$$\sigma(\Theta)d\Theta = \frac{k}{2E} \frac{(1-x)dx}{x^2(2-x)^2 \sin \pi x}$$

where x is the ratio of Θ/π and E is the energy.

- (4.15) Show that the components of the angular velocity along the space set of axes are given in terms of the Euler angles by

$$\begin{aligned}\omega_x &= \dot{\theta} \cos \phi + \dot{\psi} \sin \theta \sin \phi, \\ \omega_y &= \dot{\theta} \sin \phi - \dot{\psi} \sin \theta \cos \phi, \\ \omega_z &= \dot{\psi} \cos \theta + \dot{\phi}.\end{aligned}$$

- (4.21) A particle is thrown up vertically with initial speed v_0 , reaches a maximum height and falls back to ground.
 - Show that the Coriolis deflection when it again reaches the ground is opposite in direction, and four times greater in magnitude, than the Coriolis deflection when it is dropped at rest from the same maximum height.