

## 1 Scattering from $\frac{k}{r^3}$ Force

A fixed force center elastically scatters a particle of mass  $m$  according to the central force  $F(r) = k/r^3$ . If the initial velocity of the particle is  $u_0$ , show that the differential scattering cross section is

$$\sigma(\theta) = \frac{k \pi^2 (\pi - \theta)}{m u_0^2 \theta^2 (2\pi - \theta)^2 \sin \theta}. \quad (1.1)$$

Note: This is using Thorton's notion. In comparing Thorton and Taylor's notion we have (Thorton = Taylor):

$$\sigma(\theta) = \frac{d\sigma(\theta)}{d\Omega}. \quad (1.2)$$

Hint: Start with equations **9.122** and **9.123** from Thorton and use the change of variables  $u = 1/r$ .