Lecture 26 outline: 10/19/2020

End of Chapter 3

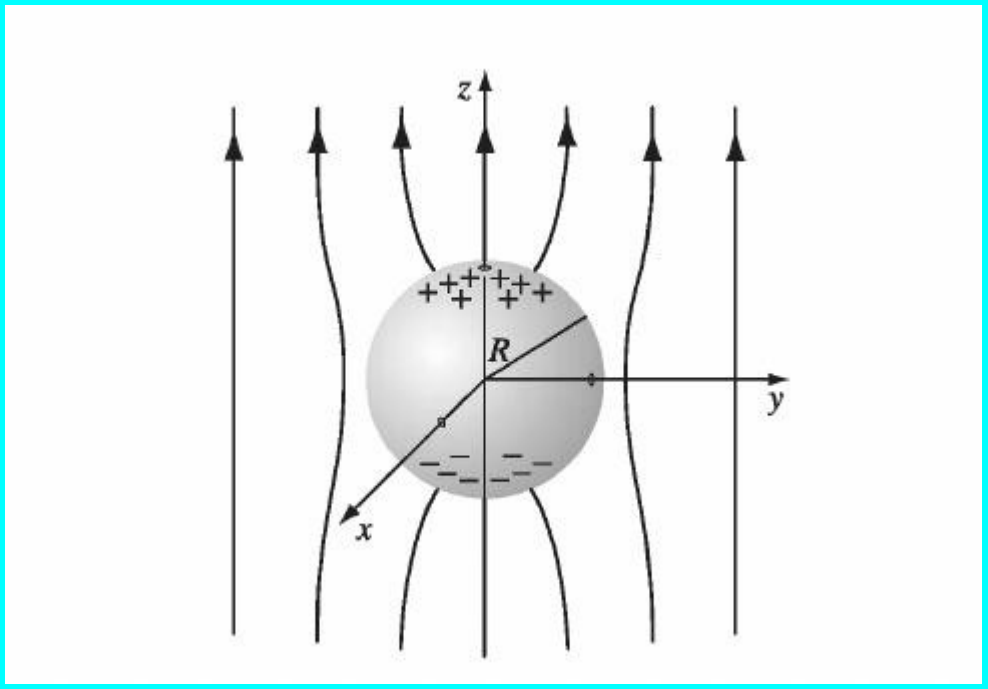
- Application
  - Conducting sphere in uniform E-field
  - Induced dipoles

Multipole expansion (see p. 153)

$$\frac{1}{\mathcal{R}} = \frac{1}{r}\sum_{0}^{\infty}\left(\frac{r'}{r}\right)^{n} P_n(\cos\alpha)$$

HW6-07 A conducting sphere of radius R is placed in a uniform electric field $\vec{E} = E_0 \hat{z}$.

What is the potential inside and outside the sphere?



$$V(r,\theta) = \left(Ar^{L} + \frac{B}{r^{L+1}}\right) \sum_{L=0}^{L=\infty} P_L(\cos\theta)$$

What is the electric field of a dipole in spherical coordinates?

$$V(r,\theta)=\frac{p\cos\theta}{4\pi\epsilon_0 r^2}$$