Chapter 5

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Consider a cube with edge lengths h centered on the origin with faces parallel to the xy, yz, and xz planes with charges q distributed uniformly in the $+x$ half and $-q$ in the $-x$ half.

(a) Find the dipole moments.

(b) Find the potential due to the dipole moments using the multipole expansion

(c) Find the total energy of the charge in an external electric field $\vec{E}_0 = E_0 \hat{x}$ (the quadrupoles are all zero for this object).