

## ENEE 680: Homework #5

Due: Thursday Nov. 12, 2009

Jackson: Problems 4.8, 4.9, 4.10,

Also: For the model frequency dependent dielectric constant introduced in class:

$$\varepsilon(\omega) / \varepsilon_0 = 1 + \frac{\omega_p^2}{\omega_0^2 - \omega^2},$$

show that the expression

$$W = \frac{1}{4} \int d^3x \frac{\partial \omega \varepsilon(\omega)}{\partial \omega} |\hat{\mathbf{E}}|^2$$

includes three contributions to stored energy. Identify each of the three modes where energy is stored.