Electrodynamics I: Assignment 10.
Due December 5 at 11:00am in class or 10:45am in the instructor's mailbox.
Short problem set this week.

1. This completes the short example from class. The end of an "ideal" parallel plate capacitor with gap *s* is partially immersed in a liquid linear-dielectric of dielectric constant ε.
a. Assuming the charge density $\pm\sigma$ on the plates is uniformly distributed, find the height of the fluid column between the plates. As the fluid rises, does the electrostatic energy between the plates increase or decrease?
b. Assuming the voltage on the plates is fixed at $\pm V_0$, find the height of the fluid column. As the fluid rises, does the electrostatic energy between the plates increase or decrease? Explain how in both cases (a) and (b) the fluid rises even though in one case the electrostatic energy increases with fluid height, while in the other case it decreases.

2. Jackson problem 4.10. A fully-analytic approach would be complicated. There's a simplification arising from considering the behavior of the fields at the boundary between the dielectric and vacuum.

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