Due date: Wednesday, Feb. 1

Griffiths reading: 7.1-2

Note: This homework is longer and more difficult than usual. You may also have to review some material from Chapter 5. Please get started early.


2. [2 points] Griffiths 7.5 (matching of load to battery).

3. [3 points] Griffiths 7.7 (sliding bar).

4. [3 points] Griffiths 7.11 (terminal velocity of falling square loop). Let the square loop have dimensions of roughly $l \times l$, being made out of wire with width $w$ and thickness $d$, so that a cross-section of the wire has area $wd$. (Strictly speaking, the outer dimensions are $(l+w) \times (l+w)$ and the inner dimensions are $(l-w) \times (l-w)$, but in the spirit of the problem we don’t worry about this level of detail.) Skip the part about “How long does it take...” We just want the terminal velocity, which you should express in terms of the mass density $\eta$ and resistivity $\rho$ of aluminum, the acceleration of gravity $g$, and $B$. Amazingly, $l$, $w$, and $d$ should all cancel out!! Then plug in the numbers and express in m/s.


6. [3 points] Griffiths 7.16 ($E$-field from $I_0 \cos(\omega t)$ in coax cable).