Midterm, initial info Pages 1 - 205, Skipping §1.1.5, §4.2.3
Continue discussion in text, up to about page 190.

Comment on charge densities.
Maxwell’s Equations make reference to $g(\vec{r})$. There is no explicit reference to $\sigma(\vec{r})$ or $\lambda(\vec{r})$, because they can be included in $g(\vec{r})$.

Examples:

2D $g(x,y,z) = \sigma_0 \delta(z)$, $\sigma_0 =$ const.
$\int_{x=-a}^{x=a} \int_{y=-a}^{y=a} \int_{z=-l}^{z=l} g \, dt = \sigma_0 L^2$

1D $g(x,y,z) = \lambda_0 \delta(x) \delta(y)$, $\lambda_0 =$ const.
$\int_{x=-a}^{x=a} \int_{y=-a}^{y=a} \int_{z=-l}^{z=l} g \, dt = \lambda_0 L$

0D $g(x,y,z) = q_0 \delta(x) \delta(y) \delta(z)$, $q_0 =$ const.
See prob. 1.47(a), page 52.

Bar Electret (Prob. 4.11, page 176)

\[ \mathbf{P} = \text{const} \]
inside
\[ \oint \mathbf{P} \cdot d\mathbf{S} \neq 0 \]

By Stoke’s Thm.
\[ \nabla \times \mathbf{P} \neq 0 \]
on surface.

Comments on HW Prob. 2

Ex. 3.8, page 145.

Surface charge density

\[ \sigma = -3e_0 \frac{V_{\text{far}}}{r} \]

\[ V_{\text{far}} = -E_0 \frac{r}{\hat{r}} \]

Rotated Version

The solution to the problem is a linear combination of these two. No symmetry axis.