

# 02ELMA - Homework 4

Assigned for the week of Mar 10, 2025

## Questions

1. Consider a uniform disc-shaped surface charge  $\sigma$  with radius  $R$ . Find the potential at a distance  $z$  above its center. Calculate the electric field using the potential. (Hint: Consider the substitution  $u = r^2 + z^2$ )
2. If we assume that the electron has a uniform surface charge distribution in the form of a spherical shell, and we calculate its rest energy using the formula  $E = mc^2$ , what would be its radius *in meters*? Find relevant quantities on the Internet such as  $m$ ,  $c$ , etc., ensuring that they are compatible in terms of units.