

# Tutoria 1

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September 2024

## 1 Problem 1

Consider a solid conducting sphere of radius  $R$  with an eccentric spherical cavity of radius  $c$ . The center of the cavity is at a distance  $b$  from the center of the metallic sphere. The sphere has a charge  $Q$ . Determine the potential inside the cavity. How does the result change if the cavity is not spherical?

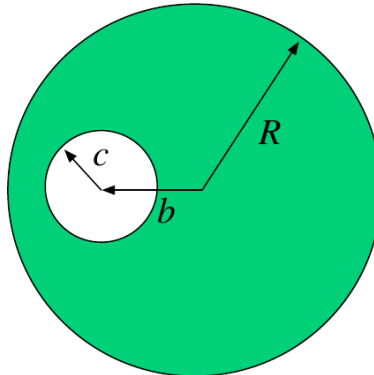


Figure 1: Solid conductive sphere

## 2 Problem 2

Let there be two concentric infinite conducting cylinders, one of them solid with radius  $R_1$ , and the other a shell with radii  $R_4$  and  $R_5$ , grounded, as shown in the figure. A volumetric charge density  $\rho_0$  is placed between the cylinders in the region of width  $(R_3 - R_2)$ .

- Determine the electric field in the entire space and the induced charge densities on the conducting surfaces.
- Calculate the potential difference between the conductors.

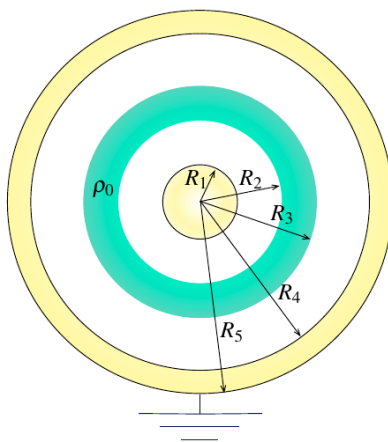


Figure 2: Infinite concentric cylinders