

Laplace's Equation in two variables
Cylindrical coordinates

1. An infinitely long metal cylinder of radius R has its axis aligned with the z axis. It is placed in a uniform electric field $\mathbf{E} = E_0\mathbf{i}$. Find the electric potential and electric field everywhere.
2. An infinitely long cylinder of radius R has its axis aligned with the z axis, and is made from a material which has a dielectric constant ϵ_r . It is placed in a uniform electric field $\mathbf{E} = E_0\mathbf{i}$. Find the electric potential and electric field everywhere.