

# Physics II

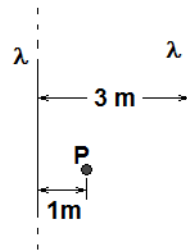
## Gauss

**Problem 1.-** Calculate the electric field 2cm away from a long thin wire that has a uniform linear density of charge  $\lambda = 25\mu\text{C}/\text{m}$

**Problem 2.-** There are two parallel infinite wires with linear density of charge  $\lambda = 2.5\mu\text{C}/\text{m}$  separated by 3 meters.

Calculate the electric field at point "P".

Suggestion: Use Gauss's theorem twice and add the *vectors*



**Problem 3.-** Find the electric field in all space due to a spherical distribution of charge given by the density.

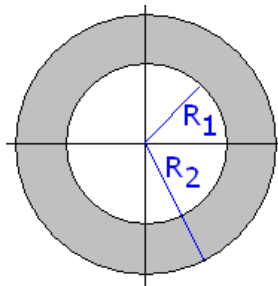
$$\rho = a(R-r) \quad r < R$$

**Problem 4.-** A sphere of radius  $R$  has a charge density  $\rho = Cr^3$ , where  $C$  is a constant and  $r$  is the distance to center of the sphere. Find the magnitude of the electric field at a distance  $r=R/2$ .

**Problem 5.-** A spherical shell of internal radius  $R_1$  and external  $R_2$  has a constant charge density in its volume  $\rho$ .

Calculate the electric field at a distance  $r$  from the center. Consider 3 cases:

- $r < R_1$
- $R_1 < r < R_2$
- $r > R_2$



**Problem 6.-** Find the electric field at point P due to a sphere of radius  $R$  and density of charge  $\rho$ , where a sphere of radius  $R/2$  has been extracted, leaving that volume hollow, as shown in the figure.

