Answer on Question #81738, Physics / Electromagnetism

Question:

Let the whole xy planet (z = 0) have charge density σ1 = 10 nC / m2 and the entire xz plane (y = 0) have charge density σ2 = -10 nC / m2.

Find the electric field (vector) in the points

a) (x, y, z) = (1,1,1) m

b) (x, y, z) = (-1, -1, -1) m

Solution:

According to Gauss's theorem for a plane $\overline{E_1} = \bar{k} 4\pi K \sigma_1 = \bar{k} 4 \cdot 3.14 \cdot 90 = \bar{k} 1.13(\frac{kV}{m})$ and $\overline{E_2} = \bar{j} 4\pi k \sigma_2 = -\bar{j} 1.13(\frac{kV}{m})$, therefore the net electric field vector at any point equals to $\overline{E} = 1.13(\bar{k} - \bar{j}) \frac{kV}{m}$.

The answer:

The net electric field vector at any point equals to $\overline{E} = 1.13(\bar{k} - \bar{j}) \frac{kV}{m}$.