

Answer on Question #58148-Physics-Electromagnetism

If we have 13 charges in a circle then what will be the electric field at the center? And how we calculate it

Answer

The electric field of 13 charges is equal to the vector sum of the electric fields of the individual charges:

$$\vec{E} = \sum_{i=1}^{13} \vec{E}_i$$

The electric fields of the individual charges are

$$\vec{E}_i = \frac{kq_i}{R^2} \vec{e}_i,$$

where \vec{e}_i is unit vector from the i -th charge to the center of the circle, R is a radius of circle, q_i is the value of the i -th charge.

Thus, the electric field at the center is dependent only on the values of the charges and their orientation on the circle.

To calculate it we need to find projections of all \vec{E}_i on two axes. To simplify this we can use perpendicular axes.