

Gradiënt van de Potentialiaal

$$\vec{E} = -\tilde{N}V$$

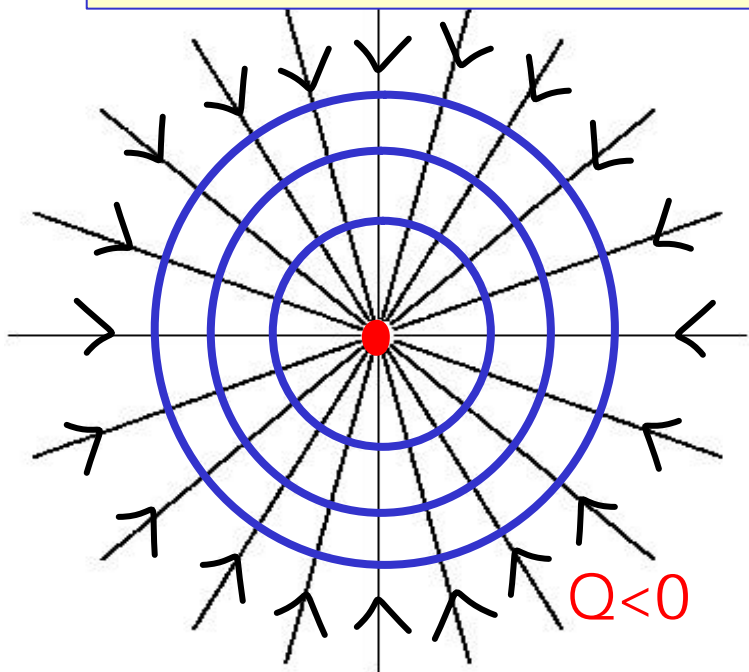
Controle voor
puntlading:

$$V = \frac{Q}{4\pi \epsilon_0 r}$$



$$\vec{E} = \frac{Q}{4\pi \epsilon_0 r^2} \hat{r}$$

Veldlijnen & equi-potentiaallijnen



$$\begin{aligned} \tilde{N} \frac{1}{r} &= \tilde{N} \frac{1}{\sqrt{x^2 + y^2 + z^2}} \\ &= \frac{\partial}{\partial x} \frac{1}{\sqrt{x^2 + y^2 + z^2}} \hat{i} + \frac{\partial}{\partial y} \dots \hat{j} + \frac{\partial}{\partial z} \dots \hat{k} \\ &= -\frac{x}{(x^2 + y^2 + z^2)^{3/2}} \hat{i} - \frac{y}{(x^2 + y^2 + z^2)^{3/2}} \hat{j} - \frac{z}{(x^2 + y^2 + z^2)^{3/2}} \hat{k} \\ &= -\frac{\hat{r}}{r^2} \end{aligned}$$

Of gebruik: $\tilde{N}f(r) = \frac{df}{dr} \hat{r}$