Vector Fields

Scalar and Vector Fields

Question

Determine the field lines of the following polar vector field.

$\underline{F} = r\underline{\hat{r}} - \underline{\hat{\theta}}$

Answer

$\underline{F} = r\underline{\hat{r}} - \underline{\hat{\theta}}$

The field lines satisfy $\frac{dr}{r} = -rd\theta$, or $-\frac{dr}{r^2} = d\theta$.

So the field lines are the spirals $\frac{1}{r} = \theta + C$, or $r = \frac{1}{(\theta+C)}$.