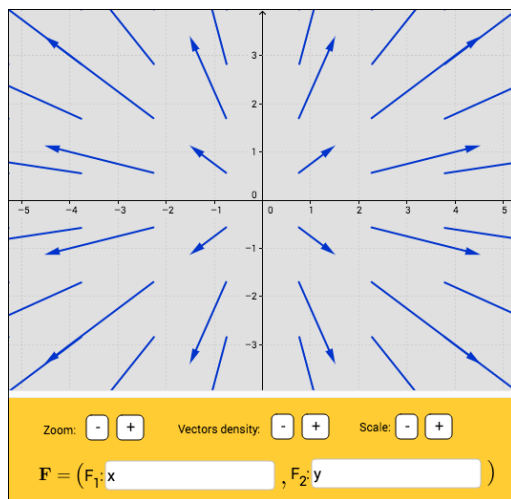


Vector fields

Use the online simulation to help you to solve these problems. Click on the link below:

https://teaching.smp.uq.edu.au/scims/Adv_calculus/Vector_field.html



- (1) Consider the vector field defined by the function

$$\mathbf{F}(x, y) = (y^2 - xy) \mathbf{i} + (xy - x^2) \mathbf{j}$$

Plot the vector field and explain its appearance. Find the set of points (x, y) such that $\mathbf{F}(x, y) = \mathbf{0}$.

- (2) Let $\mathbf{F}(\mathbf{r}) = (r^2 - 2r)\mathbf{r}$, where $\mathbf{r} = x\mathbf{i} + y\mathbf{j}$ and $r = \|\mathbf{r}\|$. Plot this vector field and change the domain of the field until you observe what is happening. Describe the appearance of the plot and explain it by finding the points where $\mathbf{F}(\mathbf{r}) = \mathbf{0}$.