

Collaborators:

Colley 3.3 #9 Sketch and describe the given vector field on \mathbb{R}^3 .

$$\mathbf{F} = (0, z, -y)$$

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Colley 3.3 #18 Verify that the path given is a flow line of the indicated vector field. Justify the result geometrically with an appropriate sketch.

$$\mathbf{x}(t) = (\sin t, \cos t, 2t), \quad \mathbf{F} = (y, -x, 2)$$

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Colley 3.3 #20 Calculate the flow line $\mathbf{x}(t)$ of the given vector field \mathbf{F} that passes through the indicated point at the specified value of t .

$$\mathbf{F}(x, y) = -x\mathbf{i} + y\mathbf{j}; \quad \mathbf{x}(0) = (2, 1).$$

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Colley 3.3 #24 Consider the vector field $\mathbf{F} = 2x\mathbf{i} + 2y\mathbf{j} - 3\mathbf{k}$.

- (a) Show that \mathbf{F} is a gradient field.
- (b) Describe the equipotential surfaces of \mathbf{F} in words and in sketches.

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