

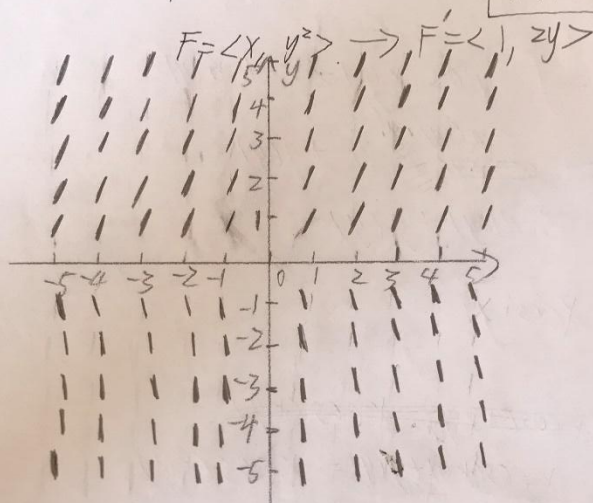
Quiz for Lecture 17

SHUBIN XIE

section 22

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1 sketch the vector planar vector field.



I am not sure, need to check with professor.

2. Find a potential function for the vector field F

$$F = \langle y \cos(xy), x \cos(xy) \rangle.$$

$$\begin{aligned} \textcircled{1} \quad \left| \begin{array}{cc} \frac{\partial}{\partial x} & \frac{\partial}{\partial y} \\ y \cos(xy) & x \cos(xy) \end{array} \right| &= \frac{d}{dy} y \cos(xy) - \frac{d}{dx} x \cos(xy) \\ &= \cos(xy) - (\sin(xy)) \cdot xy - [\cos(xy) - (\sin(xy)) \cdot xy] \\ &= \cos(xy) - (\sin(xy)) \cdot xy - \cos(xy) + (\sin(xy)) \cdot xy \\ &= 0. \end{aligned}$$

conservative.

②

$$f_x = y \cos(xy) \quad f_y = x \cos(xy)$$

$$f = \int y \cos(xy) dx + g(y)$$

$$= \frac{\sin(xy) \cdot y}{\frac{1}{y}} + g(y)$$

$$= \sin(xy) + g(y)$$

$$f_y = x \cos(xy)$$

$$\cancel{x \cos(xy)} + g'(y) = x \cos(xy)$$

$$g'(y) = 0$$

$$\text{function: } f = \sin(xy)$$

$$F = f = \sin(xy)$$

$$\text{Ans: } F = \sin(xy)$$