18.2: Evaluating Line Integrals

Calculus III

College of the Atlantic

Consider the vector field:

$$\vec{F}(x,y) = -y\vec{i} + x\vec{j} \tag{1}$$

1. Sketch the vector field in the first quadrant.

2. Evaluate:

$$\int_{C_2} \vec{F} \cdot d\vec{r}\,, \tag{2}$$

   where C_2 is the line segment that starts at $(2,0)$ and ends at the origin.

3. Evaluate:

$$\int_{C_3} \vec{F} \cdot d\vec{r}\,, \tag{3}$$

   where C_3 is the line segment that starts at the origin and ends at $(0,2)$.

4. Evaluate:

$$\int_{C_4} \vec{F} \cdot d\vec{r}\,, \tag{4}$$

   where C_4 is the line segment that starts at $(2,0)$ and ends at $(0,2)$.

5. Evaluate:

$$\int_{C_1} \vec{F} \cdot d\vec{r}\,, \tag{5}$$

   where C_1 is the quarter-circle of radius 2 centered at the origin that starts at $(2,0)$ and ends at $(0,2)$.