20.3: Curl

Calculus III

College of the Atlantic

Consider the following two vector fields:

$$\vec{E} = x\hat{i} + y\hat{j} \, , \tag{1}$$

$$\vec{B} = y\hat{i} - x\hat{j} \, , \tag{2}$$

1. Sketch each of the above vector fields.

2. Calculate the curl of both fields.

3. Calculate the circulation around a circle of radius a centered at the origin for $\vec{E}$ and $\vec{B}$.

4. Use your circulation calculations to determine the circulation density of each of the fields.

5. Calculate the curl of each of the four fields using the algebraic definition of curl.