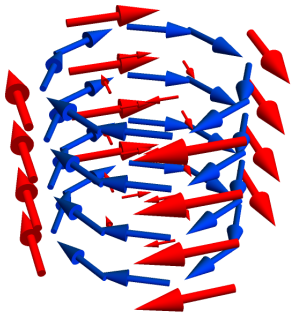
Math 2415
Homework on 16.1

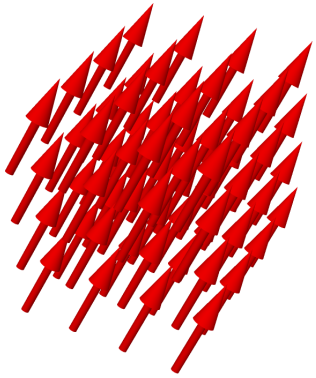
1. Match the vector fields $\mathbf{F}$ with the plots labeled A-D.

   (a) $\mathbf{F}(x, y, z) = x\mathbf{i} + 2y\mathbf{j} + 3z\mathbf{k}$

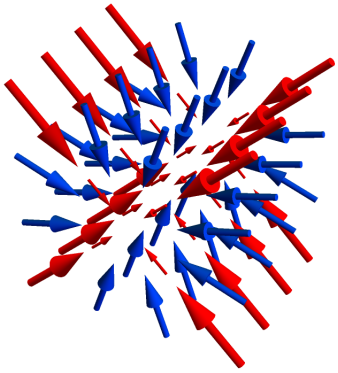
   (b) $\mathbf{F}(x, y, z) = -x\mathbf{i} - z\mathbf{k}$



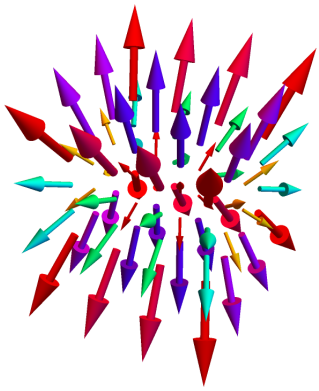
A



B



C



D

2. Sketch the following vector fields

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

   (b) $\mathbf{F}(x, y) = 2x\mathbf{i} + 4y\mathbf{j}$

   (c) $\mathbf{F}(x, y) = \nabla f$ where $f(x, y) = 4x^2 + y^2$

3. Find the gradient vector field of the following functions

   (a) $f(x, y, z) = \frac{1}{\sqrt{x^2+y^2+z^2}}$

   (b) $f(x, y) = \sin(y^2 - x^2)$