In[1]:=
```
Clear[F, GradF2D, GradF]
```

In[2]:=
```
F[x_, y_, z_] := 1 / Sqrt[x^2 + y ^2 + z^2]
```

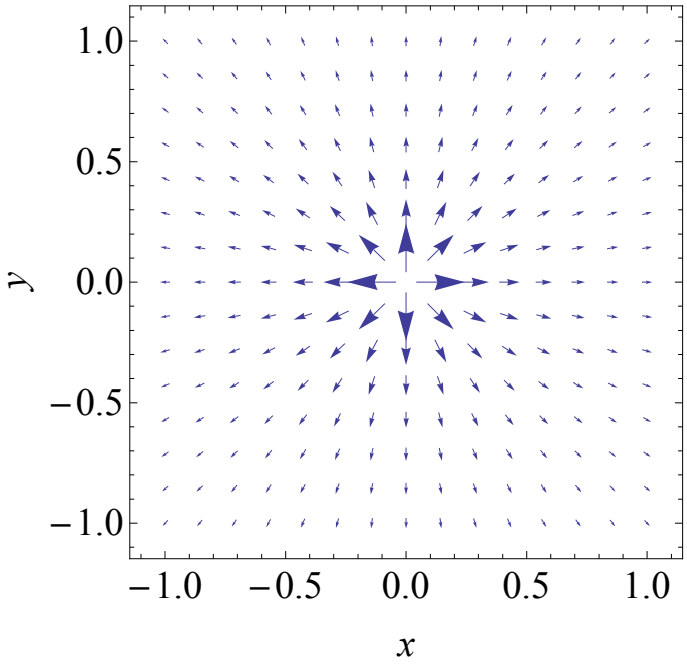
In[6]:=
```
GradF2D[x_, y_] := Evaluate[-D[F[x, y, 0], {{x, y}}]]

(* Evaluate is required to distinguish dummy
 variables for D with dummy variables for GradF2D *)
```

In[7]:=
```
GradF2D[x, y]
```

Out[7]=
$$\left\{\frac{x}{\left(x^2+y^2\right)^{3/2}}, \frac{y}{\left(x^2+y^2\right)^{3/2}}\right\}$$

In[8]:=
```
VectorPlot[GradF2D[x, y], {x, -1, 1}, {y, -1, 1},
 VectorScale → {Automatic, Medium, If[#5 > 100, 0, #5^0.4] &}, (* #5 is Norm *)
 BaseStyle → {FontSize → 20}, FrameLabel → {x, y}]
```

Out[8]=



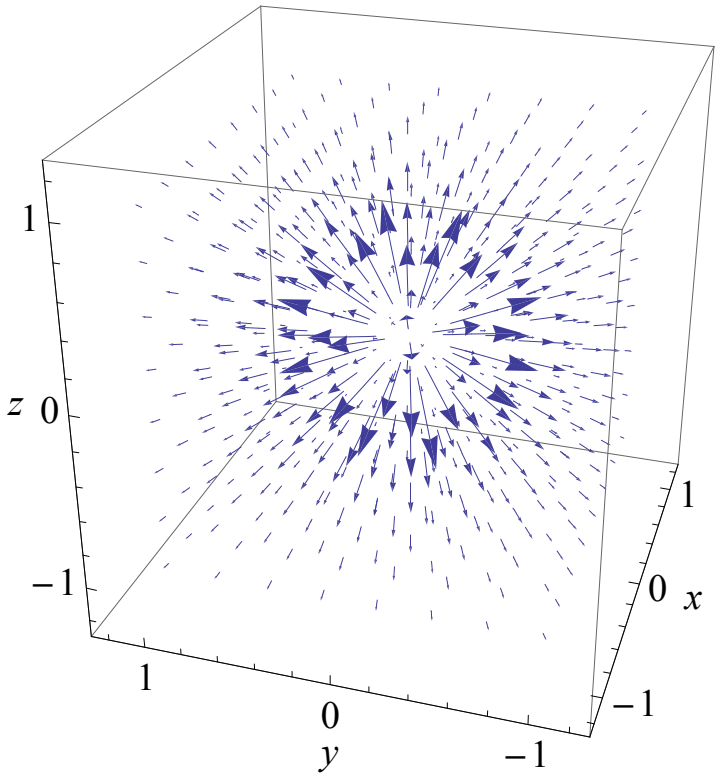
In[9]:=
```
GradF[x_, y_, z_] := Evaluate[-D[F[x, y, z], {{x, y, z}}]]
```

In[10]:=
```
GradF[x, y, z]
```

Out[10]=
$$\left\{\frac{x}{\left(x^2+y^2+z^2\right)^{3/2}}, \frac{y}{\left(x^2+y^2+z^2\right)^{3/2}}, \frac{z}{\left(x^2+y^2+z^2\right)^{3/2}}\right\}$$

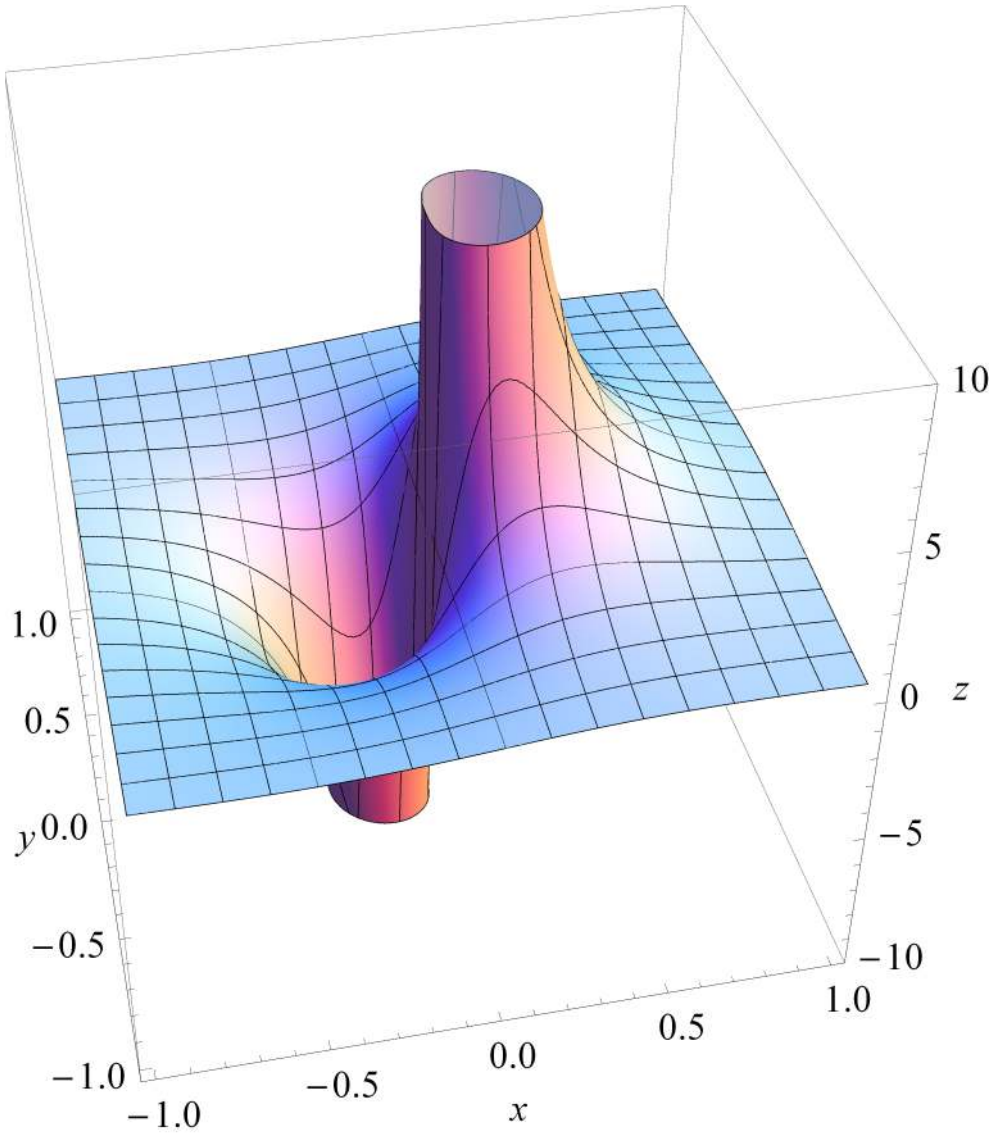
In[11]:=
```
VectorPlot3D[
 If[ Norm[GradF[x, y, z]] > 10, {0, 0, 0}, GradF[x, y, z]],
 {x, -1, 1}, {y, -1, 1}, {z, -1, 1},
 VectorScale → {Automatic, Small, Automatic},
 (* #7 is expected to be Norm but not *)
 BaseStyle → {FontSize → 20}, AxesLabel → {x, y, z}]
```

Out[11]=



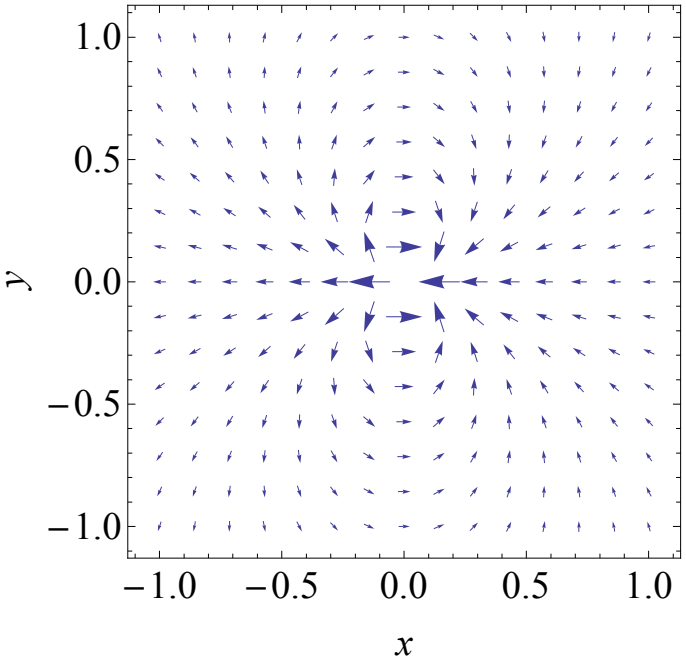
In[12]:=
```
Plot3D[(* to avoid sprious at origin, y-coordinate was shifted slightly *)
 GradF[x, y + 0.00001, 0] . {1, 0, 0}, {x, -1, 1}, {y, -1, 1},
 BoxRatios → 2, PlotRange → {-10, 10}, ClippingStyle → Opacity[0.5],
 AxesLabel → {x, y, z}, ImageSize → 512,
 BaseStyle → {FontSize → 20}, PerformanceGoal → "Quality",
 PlotPoints → {101, 101}]
```

Out[12]=



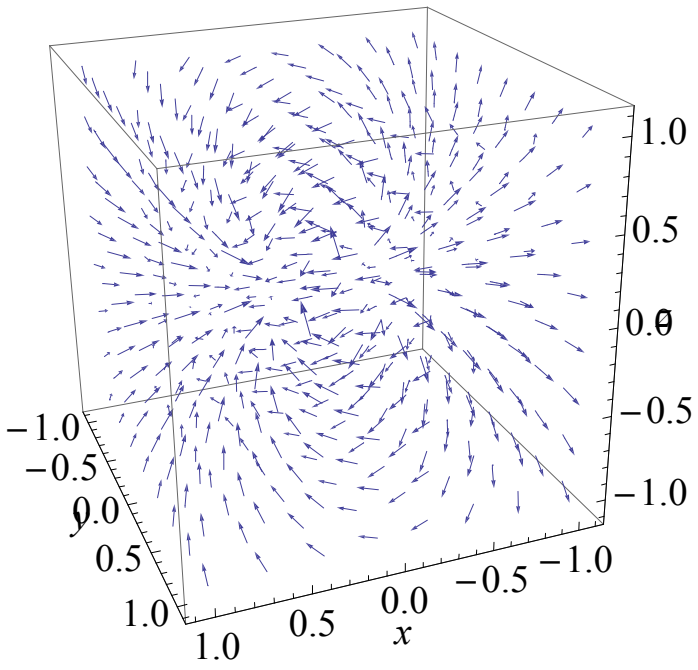
In[13]:=
```
VectorPlot[
 Evaluate[ D[GradF[x, y, 0] . {1, 0, 0}, {{x, y}}] ],
 {x, -1, 1}, {y, -1, 1}, (* #5 is Norm *)
 VectorScale → {Small, Medium, If[#5 > 1000, 0, #5^0.2] &},
 BaseStyle → {FontSize → 20}, FrameLabel → {x, y}]
```

Out[13]=



In[16]:=
```
VectorPlot3D[
 Evaluate[ D[GradF[x, y, z] . {1, 0, 0}, {{x, y, z}}] ],
 {x, -1, 1}, {y, -1, 1}, {z, -1, 1},
 VectorScale → {Small, Small, If[#5 > 20, 0, #5^0.1] &},
 BaseStyle → {FontSize → 20}, AxesLabel → {x, y, z}]
```

Out[16]=



In[17]:=
```
Show[ (* Contour plot for constant electric field is added*)
 ContourPlot3D[Abs[GradF[x, y, z] . {1, 0, 0}] == {1 / 3, 1, 3},
  {x, -1, 1}, {y, -1, 1}, {z, -1, 1},
  ContourStyle → Opacity[0.3], Mesh → None,
  BaseStyle → {FontSize → 20}, AxesLabel → {x, y, z}],
 VectorPlot3D[
  Evaluate[ D[GradF[x, y, z] . {1, 0, 0}, {{x, y, z}}] ],
  {x, -1, 1}, {y, -1, 1}, {z, -1, 1}, VectorStyle → "Arrow3D",
  VectorScale → {Medium, Medium, If[#5 > 20, 0, #5^0.1] &},
  VectorPoints → {6, 4, 4},
  BaseStyle → {FontSize → 20}, AxesLabel → {x, y, z}]]
```

Out[17]=