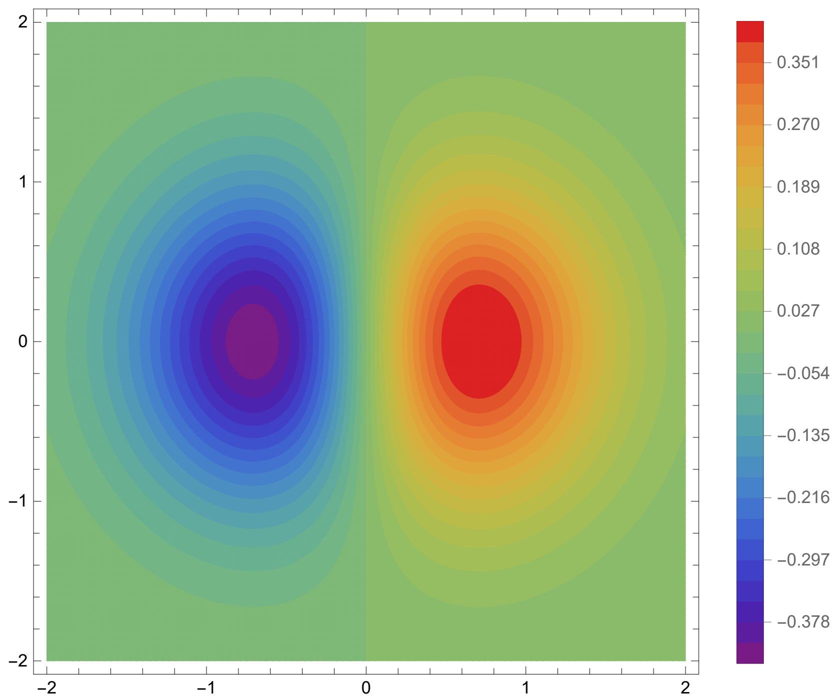
In[1]:=
```
f[x_, y_] := x Exp[-(x^2 + y^2)];
A[x_, y_] = D[f[x, y], x]
B[x_, y_] = D[f[x, y], y]
ContourPlot[f[x, y], {x, -2, 2}, {y, -2, 2}, PlotPoints → 100, Contours → 30,
 ContourStyle → None, PlotLegends → Automatic, ColorFunction → "Rainbow"]
VectorPlot[{A[x, y], B[x, y]}, {x, -2, 2}, {y, -2, 2},
 VectorColorFunction → Function[{x, y, u, v, norm}, ColorData["Rainbow"][norm]],
 VectorColorFunctionScaling → True, PlotLabel → "Vector Field Colored by Magnitude"]
```

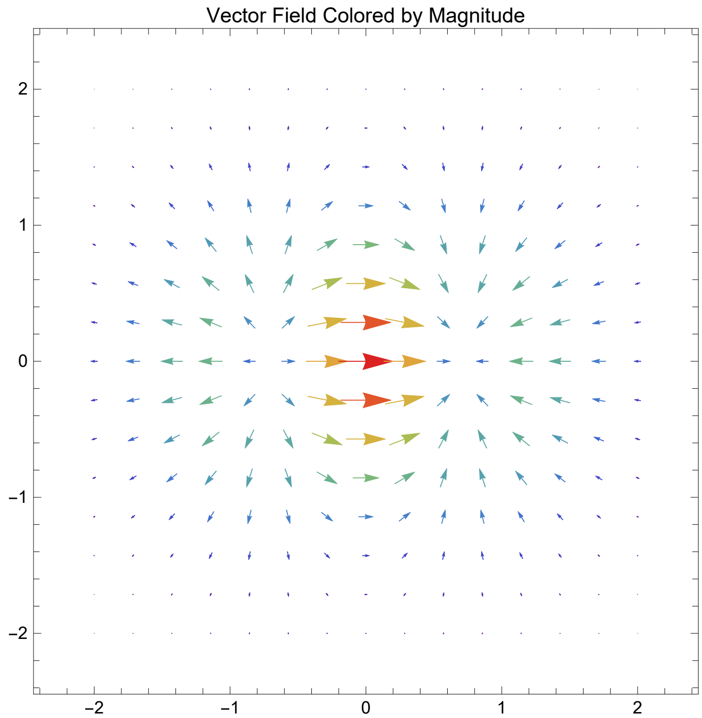
Out[2]= $e^{-x^2-y^2} - 2\, e^{-x^2-y^2}\, x^2$

Out[3]= $-2\, e^{-x^2-y^2}\, x\, y$

Out[4]=



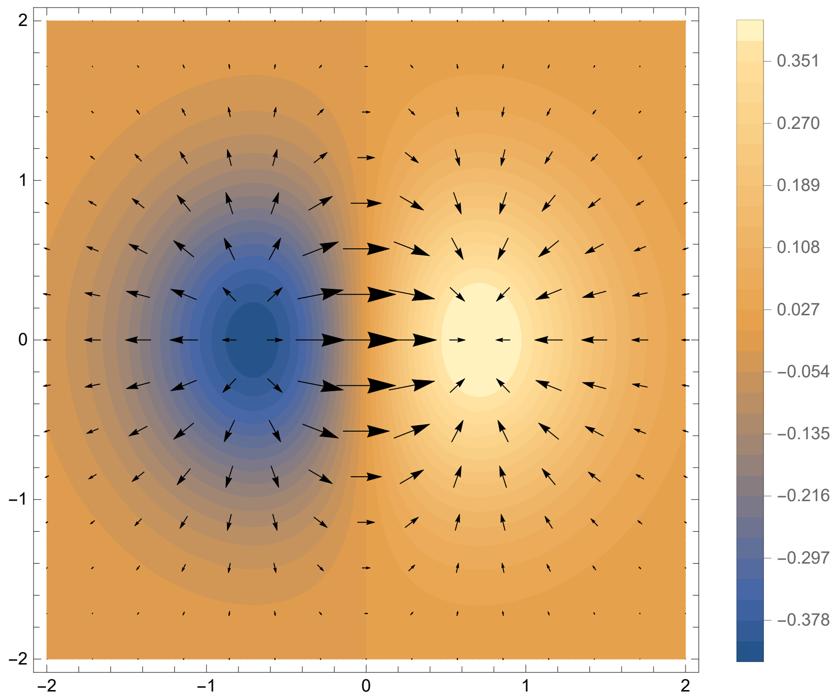
Out[5]=



In[6]:=
```
f[x_, y_] := x Exp[-(x^2 + y^2)];
grad = Grad[f[x, y], {x, y}]
plot1 = ContourPlot[f[x, y], {x, -2, 2}, {y, -2, 2}, PlotPoints → 100,
   Contours → 30, ContourStyle → None, PlotLegends → Automatic];
plot2 = VectorPlot[grad, {x, -2, 2}, {y, -2, 2}, VectorStyle → Black];
Show[plot1, plot2]
```

Out[7]= $\left\{e^{-x^2-y^2} - 2\, e^{-x^2-y^2} x^2,\ -2\, e^{-x^2-y^2} x\, y\right\}$

Out[10]=

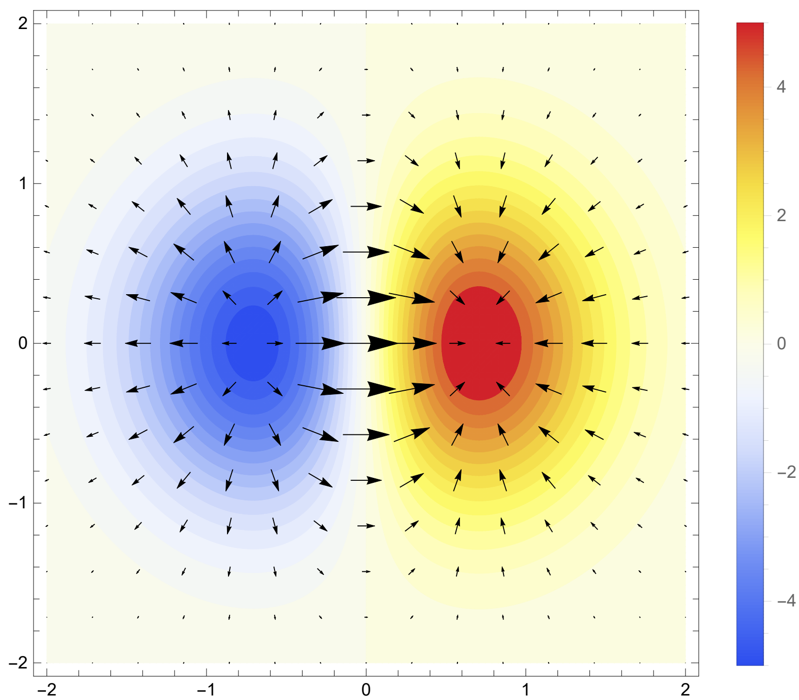


In[11]:=
```
f[x_, y_] := x Exp[-(x^2 + y^2)];
A = D[f[x, y], x]
B = D[f[x, y], y]
plot1 = ContourPlot[f[x, y], {x, -2, 2}, {y, -2, 2}, PlotPoints → 100, Contours → 30,
   ContourStyle → None, PlotLegends → BarLegend[{"TemperatureMap", {-5, 5}}],
   ColorFunction → "TemperatureMap"];
plot2 = VectorPlot[{A, B}, {x, -2, 2}, {y, -2, 2}, VectorStyle → Black];
Show[plot1, plot2]
```

Out[12]= $e^{-x^2-y^2} - 2\, e^{-x^2-y^2}\, x^2$

Out[13]= $-2\, e^{-x^2-y^2}\, x\, y$

Out[16]=

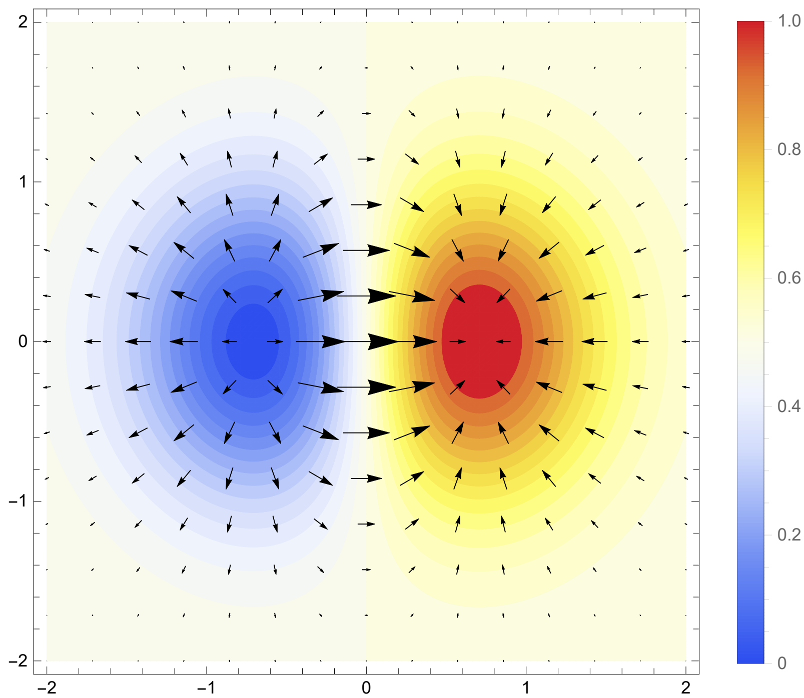


In[17]:=
```
f[x_, y_] := x Exp[- (x^2 + y^2)];
A = D[f[x, y], x]
B = D[f[x, y], y]
plot1 = ContourPlot[f[x, y], {x, -2, 2},
   {y, -2, 2}, PlotPoints → 100, Contours → 30, ContourStyle → None,
   PlotLegends → BarLegend[{"TemperatureMap", {0, 1}}], ColorFunction → "TemperatureMap"];
plot2 = VectorPlot[{A, B}, {x, -2, 2}, {y, -2, 2}, VectorStyle → Black];
Show[plot1, plot2]
```

Out[18]= $e^{-x^2-y^2} - 2 e^{-x^2-y^2} x^2$

Out[19]= $-2 e^{-x^2-y^2} x y$

Out[22]=

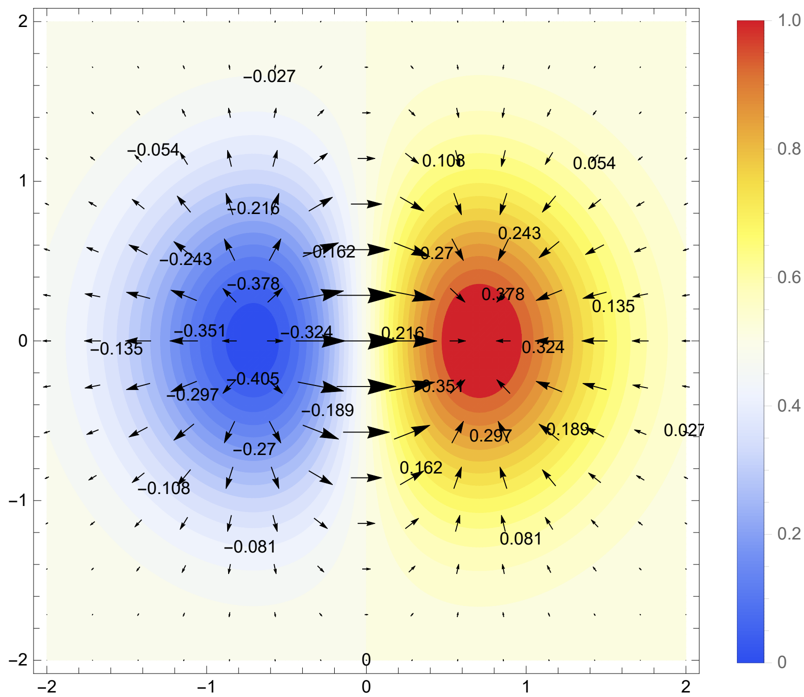


In[23]:=
```
f[x_, y_] := x Exp[- (x^2 + y^2)];
A = D[f[x, y], x]
B = D[f[x, y], y]
plot1 = ContourPlot[f[x, y], {x, -2, 2}, {y, -2, 2},
   PlotPoints → 100, Contours → 30, ContourStyle → None, ContourLabels → True,
   PlotLegends → BarLegend[{"TemperatureMap", {0, 1}}], (*Setting range in legend
    may show wrong data from the plot*)ColorFunction → "TemperatureMap"];
plot2 = VectorPlot[{A, B}, {x, -2, 2}, {y, -2, 2}, VectorStyle → Black];
Show[plot1, plot2]
```

Out[24]= $e^{-x^2-y^2} - 2\, e^{-x^2-y^2}\, x^2$

Out[25]= $-2\, e^{-x^2-y^2}\, x\, y$

Out[28]=

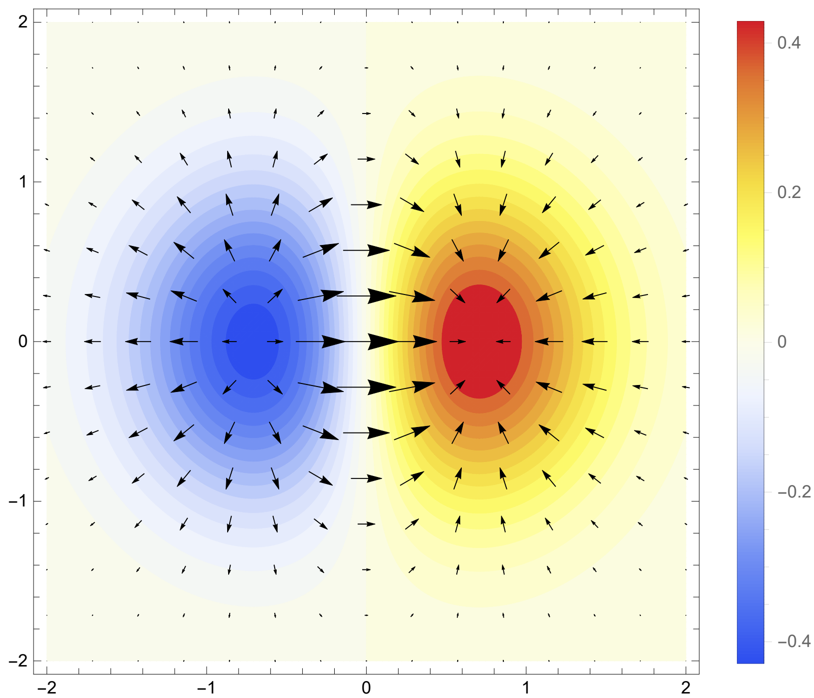


In[29]:=
```
f[x_, y_] := x Exp[- (x^2 + y^2)];
A = D[f[x, y], x]
B = D[f[x, y], y]
plot1 = ContourPlot[f[x, y], {x, -2, 2},
   {y, -2, 2}, PlotPoints → 100, Contours → 30, ContourStyle → None,
   PlotLegends → BarLegend[Automatic, None], ColorFunction → "TemperatureMap"];
plot2 = VectorPlot[{A, B}, {x, -2, 2}, {y, -2, 2}, VectorStyle → Black];
Show[plot1, plot2]
```

Out[30]= $e^{-x^2-y^2} - 2\, e^{-x^2-y^2}\, x^2$

Out[31]= $-2\, e^{-x^2-y^2}\, x\, y$

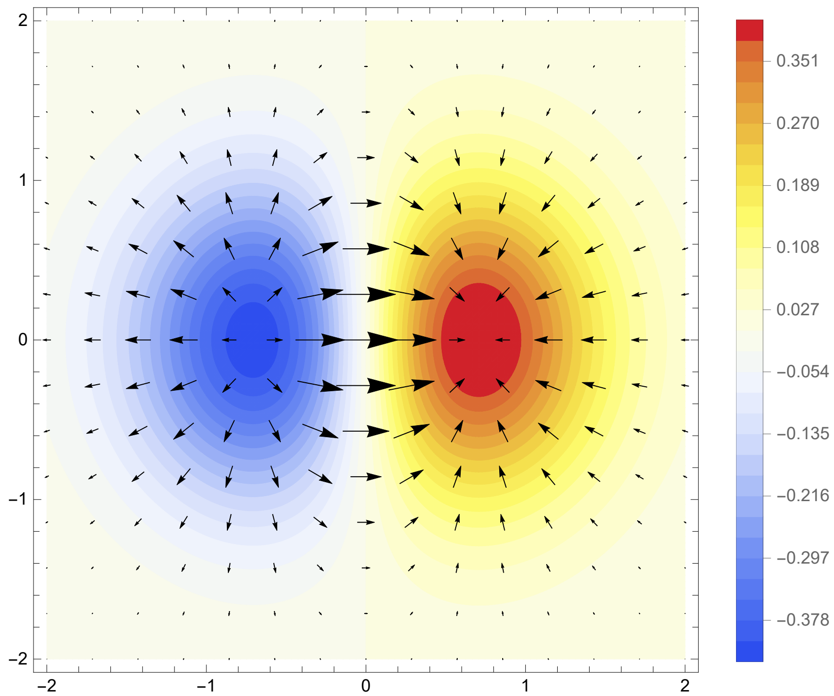
Out[34]=



In[35]:=
```
f[x_, y_] := x Exp[- (x^2 + y^2)];
grad = Grad[f[x, y], {x, y}]
plot1 = ContourPlot[f[x, y], {x, -2, 2}, {y, -2, 2}, PlotPoints → 100, Contours → 30,
   ContourStyle → None, PlotLegends → Automatic, ColorFunction → "TemperatureMap"];
plot2 = VectorPlot[grad, {x, -2, 2}, {y, -2, 2}, VectorStyle → Black];
Show[plot1, plot2]
```

Out[36]= $\left\{e^{-x^2-y^2} - 2\, e^{-x^2-y^2}\, x^2,\ -2\, e^{-x^2-y^2}\, x\, y\right\}$

Out[39]=



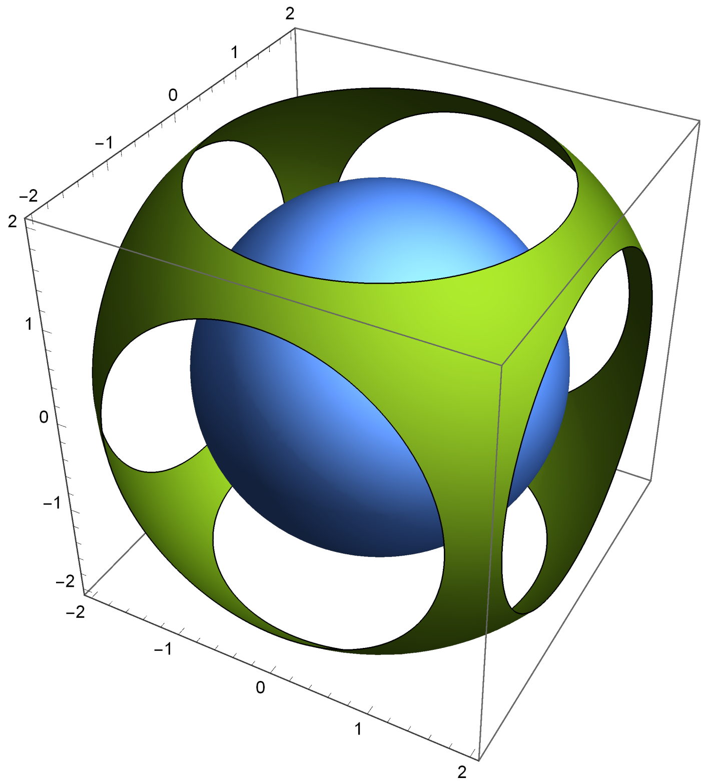
In[40]:=
```
f[x_, y_, z_] := Sqrt[x^2 + y^2 + z^2];
a = D[f[x, y, z], x]
b = D[f[x, y, z], y]
c = D[f[x, y, z], z]
ContourPlot3D[f[x, y, z], {x, -2, 2}, {y, -2, 2}, {z, -2, 2}, Mesh → None]
VectorPlot3D[{a, b, c}, {x, -2, 2}, {y, -2, 2}, {z, -2, 2},
 VectorColorFunction → Function[{x, y, z, u, v, w, norm}, ColorData["Rainbow"][norm]],
 VectorColorFunctionScaling → True]
```

Out[41]= $\dfrac{x}{\sqrt{x^2 + y^2 + z^2}}$

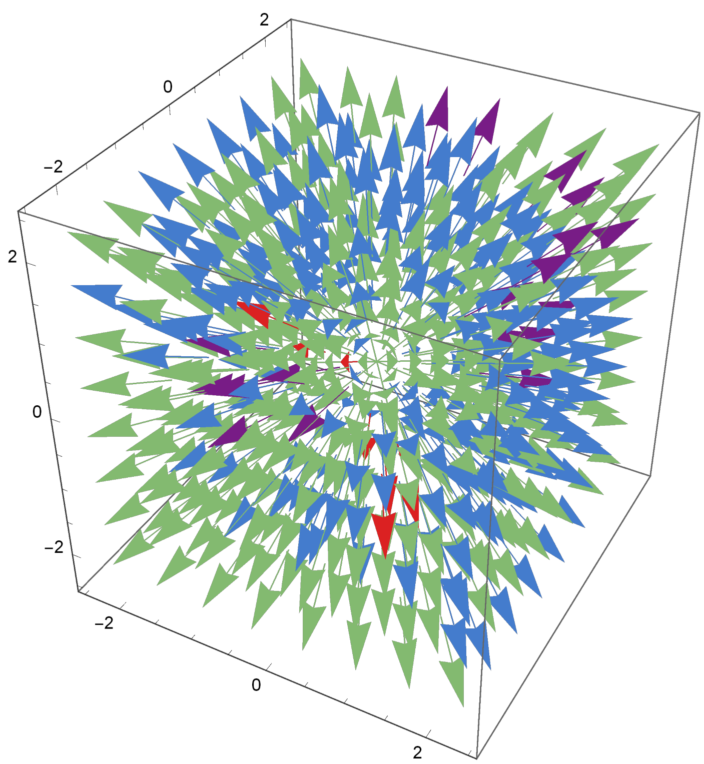
Out[42]= $\dfrac{y}{\sqrt{x^2 + y^2 + z^2}}$

Out[43]= $\dfrac{z}{\sqrt{x^2 + y^2 + z^2}}$

Out[44]=



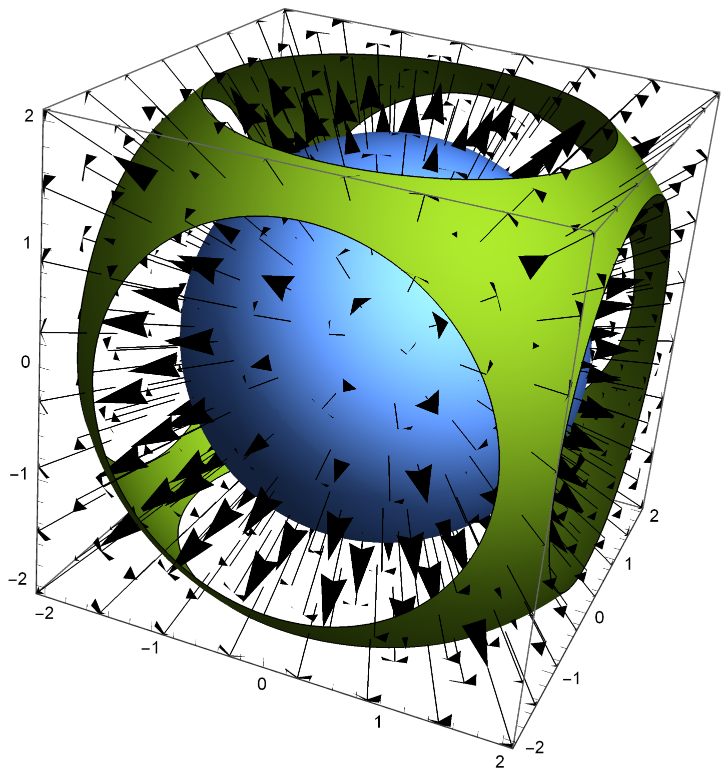
Out[45]=



In[46]:=
```
f[x_, y_, z_] := Sqrt[x^2 + y^2 + z^2];
grad = Grad[f[x, y, z], {x, y, z}]
plot1 = ContourPlot3D[f[x, y, z], {x, -2, 2}, {y, -2, 2}, {z, -2, 2}, Mesh → None];
plot2 = VectorPlot3D[grad, {x, -2, 2}, {y, -2, 2}, {z, -2, 2}, VectorStyle → Black];
Show[plot1, plot2]
```

Out[47]= $\left\{\frac{x}{\sqrt{x^2+y^2+z^2}}, \frac{y}{\sqrt{x^2+y^2+z^2}}, \frac{z}{\sqrt{x^2+y^2+z^2}}\right\}$

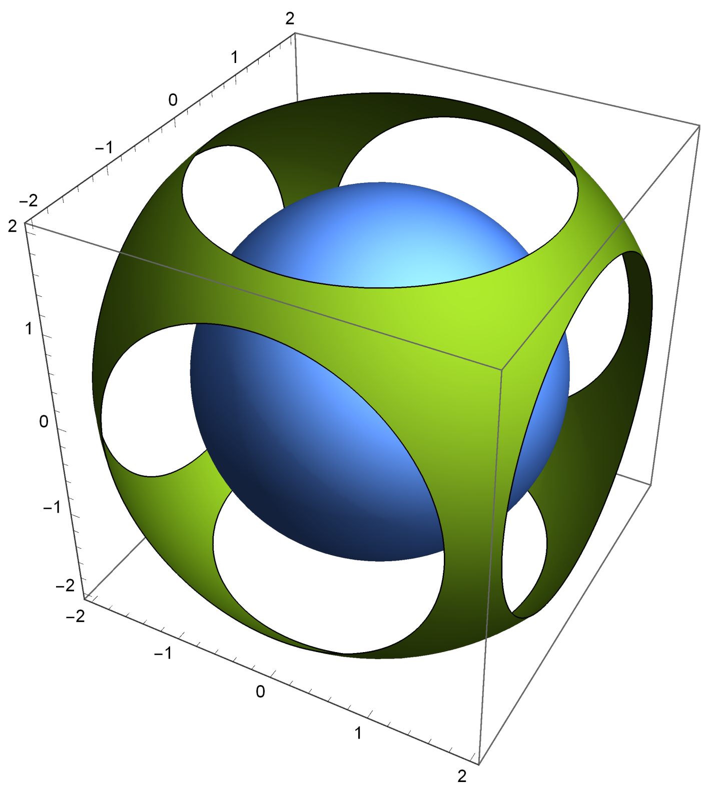
Out[50]=



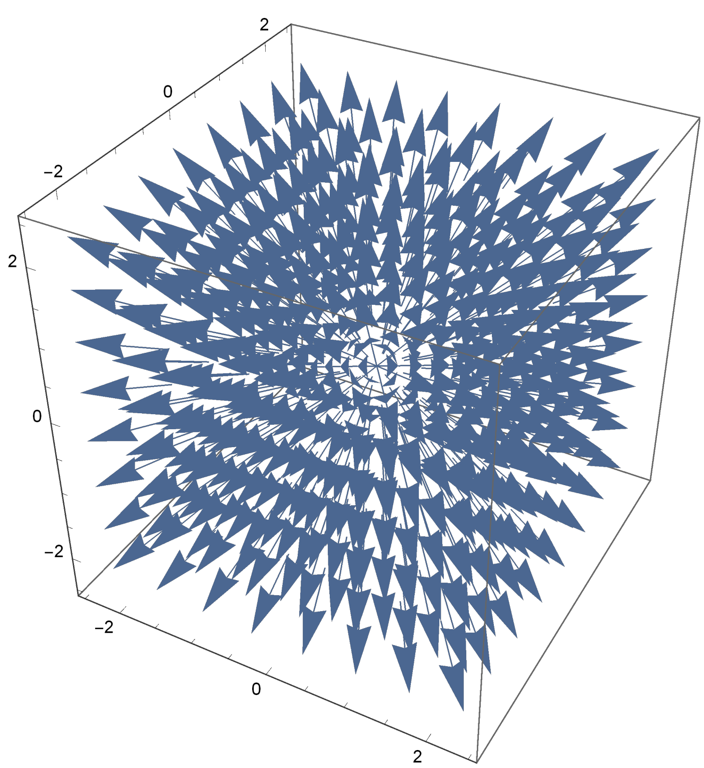
In[51]:=
```
f[x_, y_, z_] := Sqrt[x^2 + y^2 + z^2];
grad = Grad[f[x, y, z], {x, y, z}]
ContourPlot3D[f[x, y, z], {x, -2, 2}, {y, -2, 2}, {z, -2, 2}, Mesh → None]
VectorPlot3D[grad, {x, -2, 2}, {y, -2, 2}, {z, -2, 2}]
```

Out[52]= $\left\{\frac{x}{\sqrt{x^2+y^2+z^2}}, \frac{y}{\sqrt{x^2+y^2+z^2}}, \frac{z}{\sqrt{x^2+y^2+z^2}}\right\}$

Out[53]=



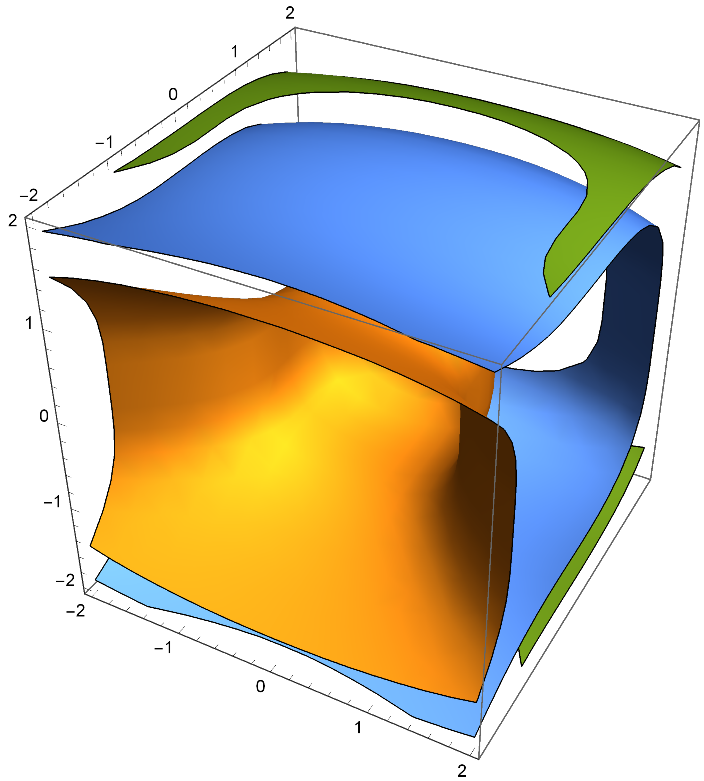
Out[54]=



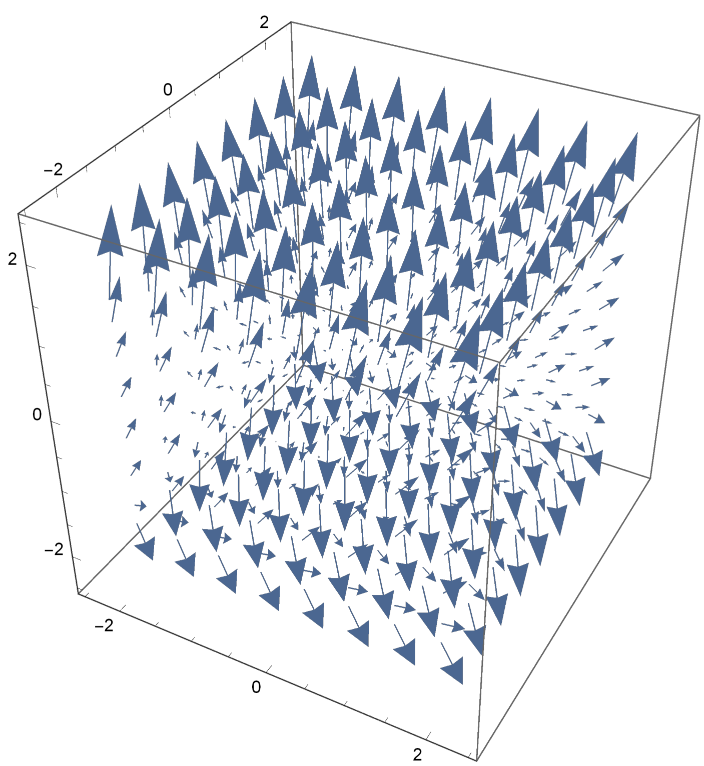

```
In[55]:= f[x_, y_, z_] := x^2 + y^3 + z^4;
grad = Grad[f[x, y, z], {x, y, z}]
ContourPlot3D[f[x, y, z], {x, -2, 2}, {y, -2, 2}, {z, -2, 2}, Mesh → None]
VectorPlot3D[grad, {x, -2, 2}, {y, -2, 2}, {z, -2, 2}]
```

Out[56]= $\{2\,x,\ 3\,y^2,\ 4\,z^3\}$

Out[57]=



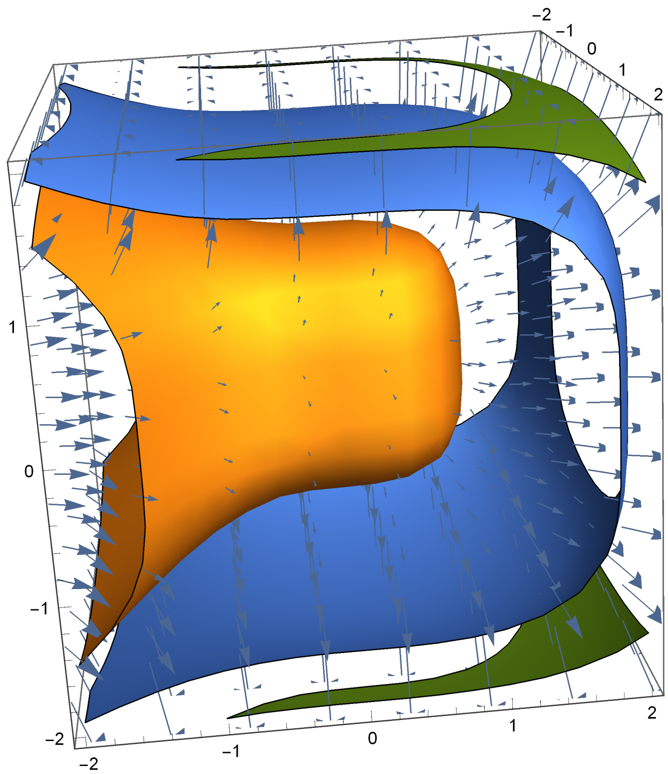
Out[58]=



In[59]:=
```
f[x_, y_, z_] := x^2 + y^3 + z^4;
grad = Grad[f[x, y, z], {x, y, z}]
plot1 = ContourPlot3D[f[x, y, z], {x, -2, 2}, {y, -2, 2}, {z, -2, 2}, Mesh → None];
plot2 = VectorPlot3D[grad, {x, -2, 2}, {y, -2, 2}, {z, -2, 2}];
Show[plot1, plot2]
```

Out[60]= $\{2\,x,\ 3\,y^2,\ 4\,z^3\}$

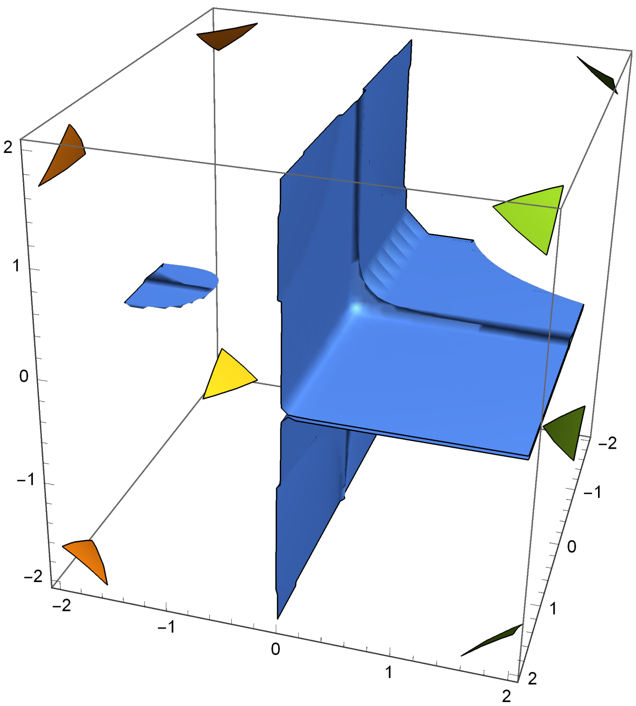
Out[63]=



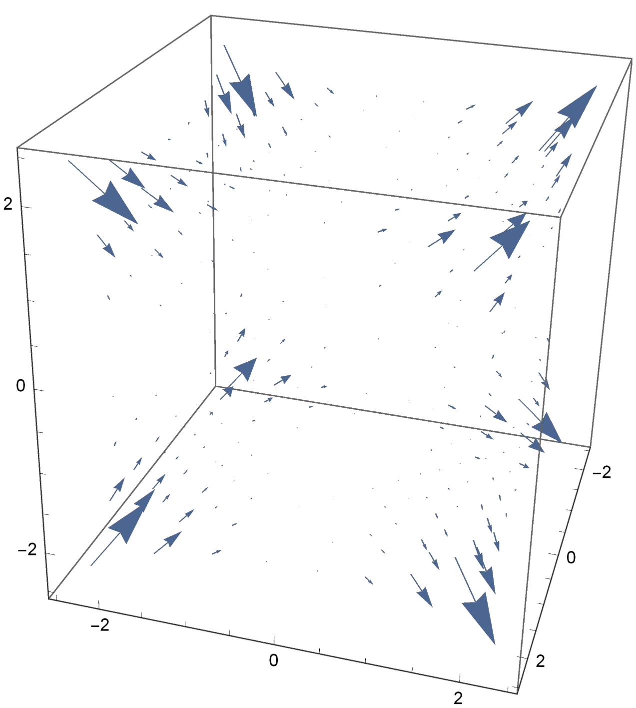
In[64]:=
```
f[x_, y_, z_] := x^2 y^3 z^4;
grad = Grad[f[x, y, z], {x, y, z}]
ContourPlot3D[f[x, y, z], {x, -2, 2}, {y, -2, 2}, {z, -2, 2}, Mesh → None]
VectorPlot3D[grad, {x, -2, 2}, {y, -2, 2}, {z, -2, 2}]
```

Out[65]= $\{2\, x\, y^3\, z^4,\ 3\, x^2\, y^2\, z^4,\ 4\, x^2\, y^3\, z^3\}$

Out[66]=



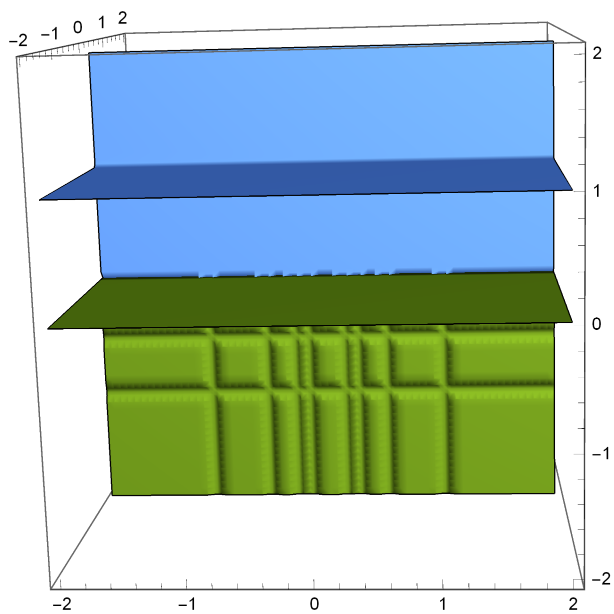
Out[67]=



In[68]:=
```
f[x_, y_, z_] := Exp[x] Sin[y] Log[z];
grad = Grad[f[x, y, z], {x, y, z}]
ContourPlot3D[f[x, y, z], {x, -2, 2}, {y, -2, 2}, {z, -2, 2}, Mesh → None]
VectorPlot3D[grad, {x, -2, 2}, {y, -2, 2}, {z, -2, 2}]
```

Out[69]= $\left\{e^x \text{Log}[z] \text{Sin}[y],\ e^x \text{Cos}[y] \text{Log}[z],\ \frac{e^x \text{Sin}[y]}{z}\right\}$

Out[70]=



Out[71]=