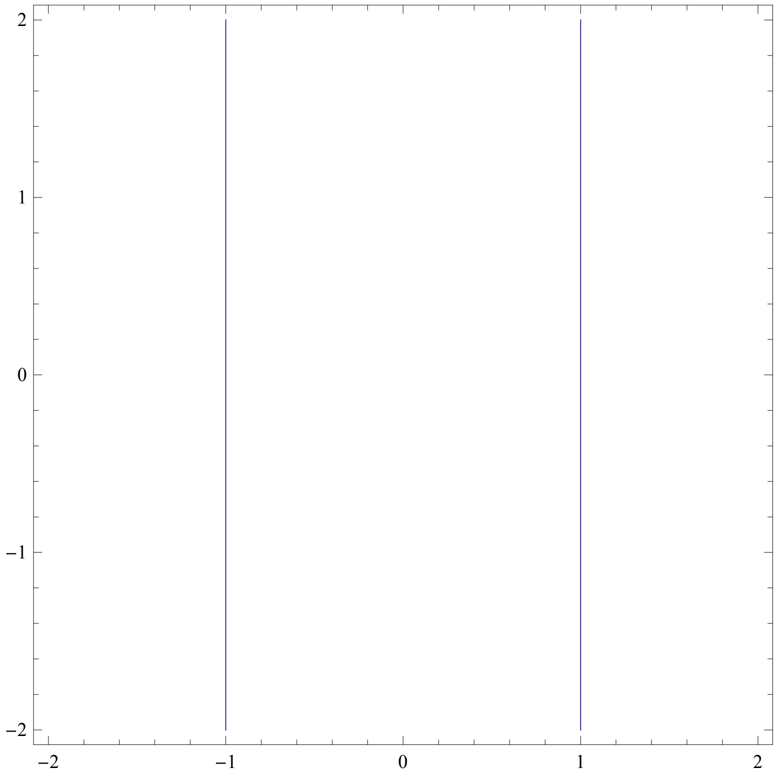
Normalformen von Quadriken n=2

(I,1,0): 2 parallele Geraden

In[1]:=
```
Q = x₁^2 - 1
```

Out[1]= $x_1^2 - 1$

In[2]:=
```
ContourPlot[Q == 0, {x₁, -2, 2}, {x₂, -2, 2}]
```

Out[2]= 

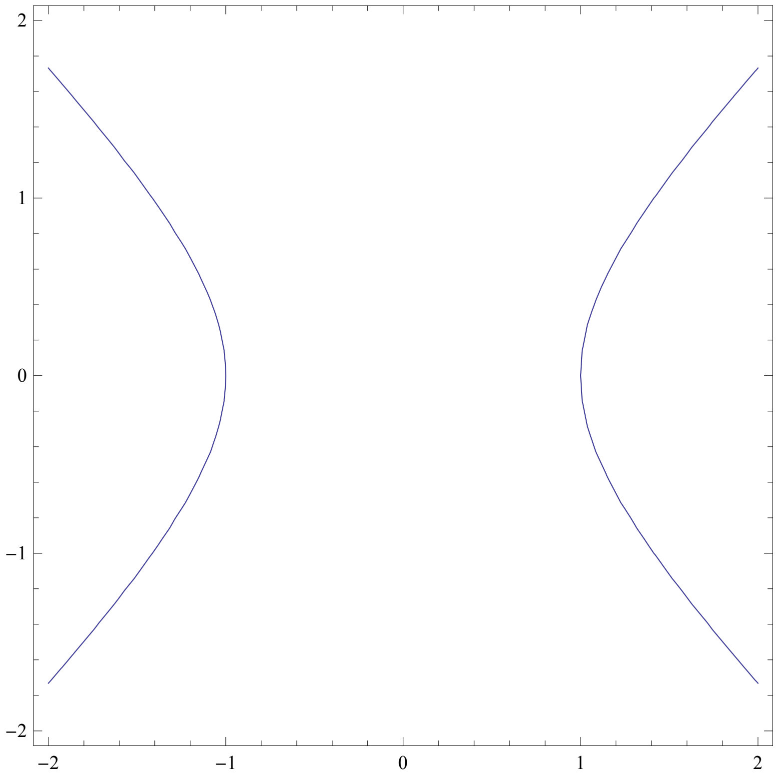
(I,2,1): Hyperbel

In[3]:=
```
Q = x₁^2 - x₂^2 - 1
```

Out[3]= $x_1^2 - x_2^2 - 1$

In[4]:= `ContourPlot[Q == 0, {x₁, -2, 2}, {x₂, -2, 2}]`

Out[4]=



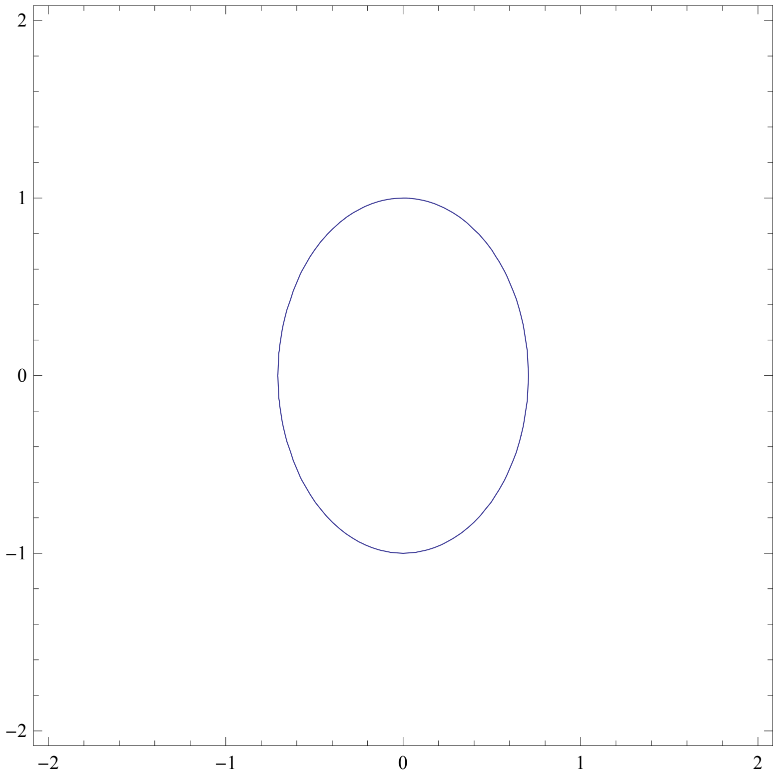
- **(I,2,2): Ellipse**

In[5]:= `Q = 2 x₁^2 + x₂^2 - 1`

Out[5]= $2\,x_1^2 + x_2^2 - 1$

In[6]:=
```
ContourPlot[Q == 0, {x1, -2, 2}, {x2, -2, 2}]
```

Out[6]=



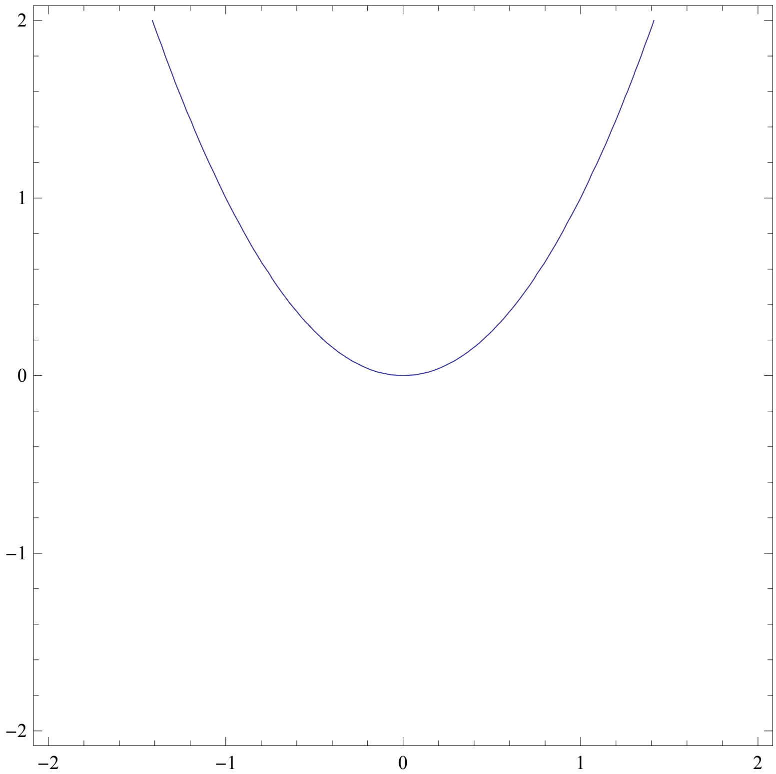
- **(II,1,1): Parabel**

In[7]:=
```
Q = x1^2 - x2
```

Out[7]= $x_1^2 - x_2$

In[8]:= `ContourPlot[Q == 0, {x₁, -2, 2}, {x₂, -2, 2}]`

Out[8]=

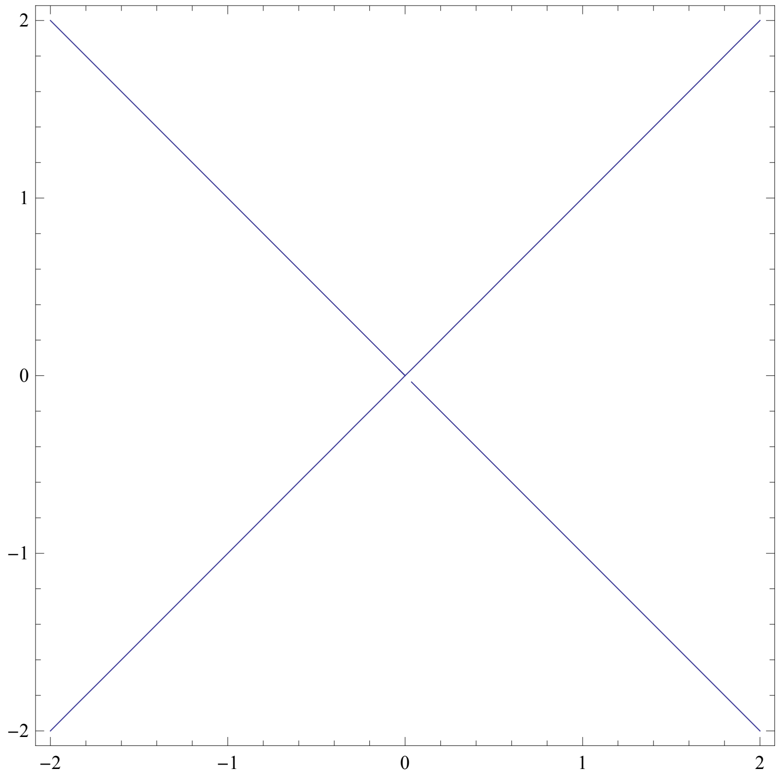


- **(III,2,1): 2 Geraden**

In[9]:= $Q = x_1^2 - x_2^2$

Out[9]= $x_1^2 - x_2^2$

In[10]:= `ContourPlot[Q == 0, {x1, -2, 2}, {x2, -2, 2}]`

Out[10]=


■ Normalformen von Quadriken n=3

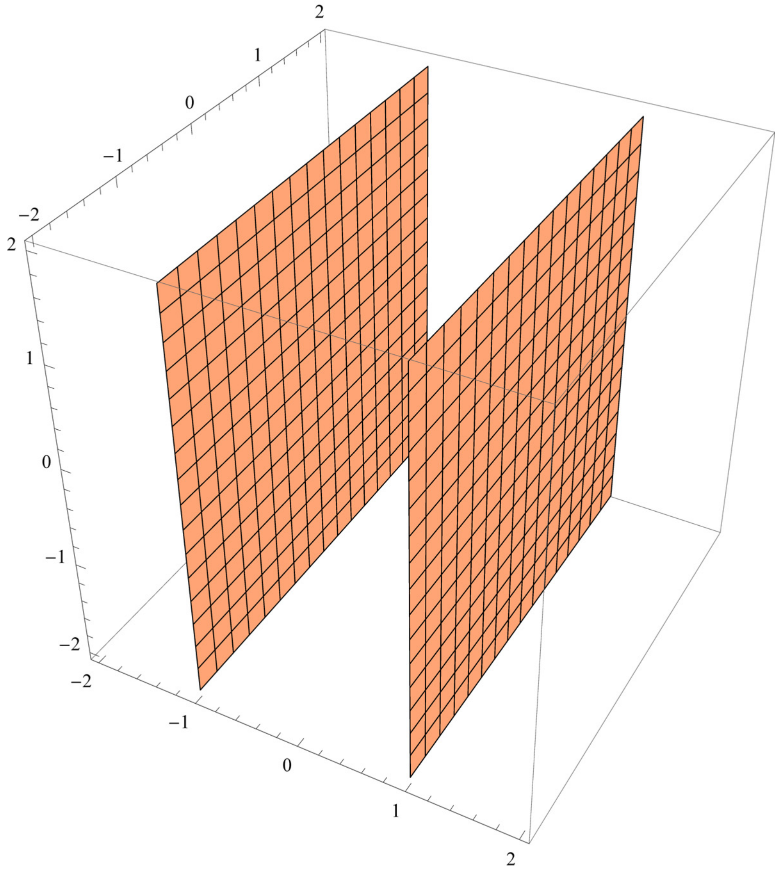
■ (I,1,1): 2 parallele Ebenen

In[11]:= `Q = x1^2 - 1`

Out[11]= $x_1^2 - 1$

In[12]:= `ContourPlot3D[Q == 0, {x1, -2, 2}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 5]`

Out[12]=



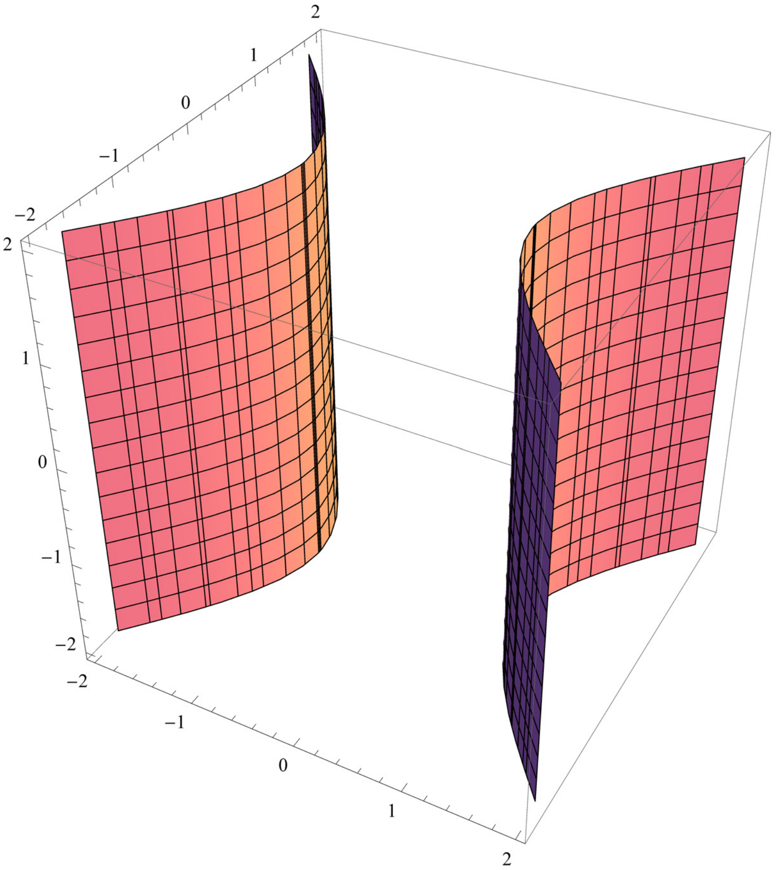
- **(I,2,1): Hyperbelzylinder**

In[13]:= $Q = x_1{}^2 - x_2{}^2 - 1$

Out[13]= $x_1^2 - x_2^2 - 1$

In[14]:= `ContourPlot3D[Q == 0, {x1, -2, 2}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 10]`

Out[14]=



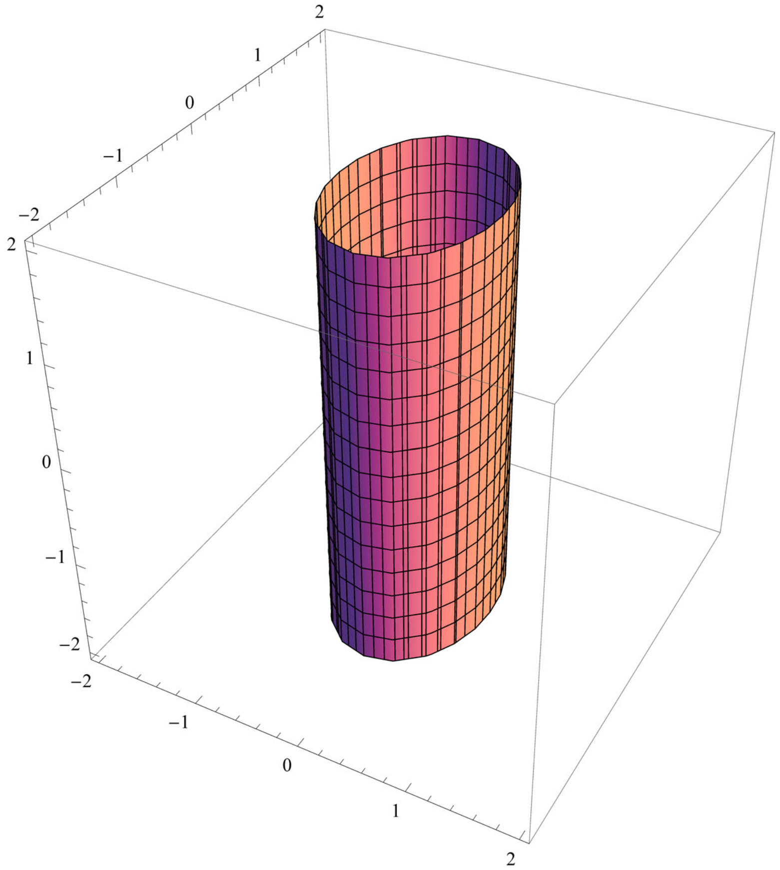
- **(I,2,2): Ellipsenzylinder**

In[15]:= $Q = 2\,x_1{}^2 + x_2{}^2 - 1$

Out[15]= $2\,x_1^2 + x_2^2 - 1$

In[16]:=
```
ContourPlot3D[Q == 0, {x1, -2, 2}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 10]
```

Out[16]=



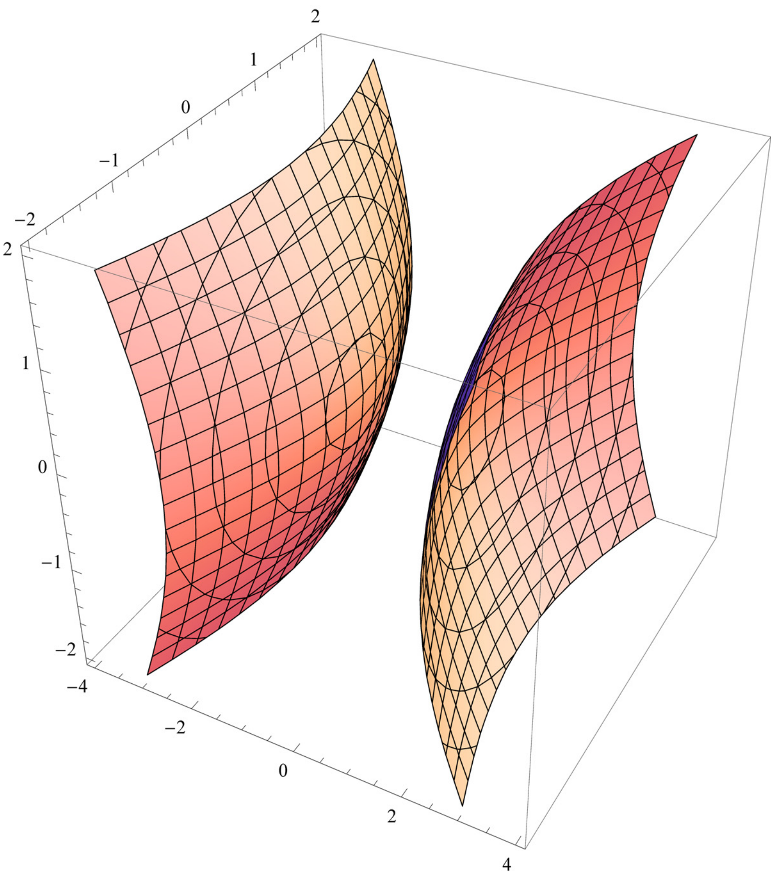
- **(I,3,1): zweischaliges Hyperboloid**

In[17]:=
```
Q = x1^2 - x2^2 - x3^2 - 1
```

Out[17]= $x_1^2 - x_2^2 - x_3^2 - 1$

In[18]:= `ContourPlot3D[Q == 0, {x1, -4, 4}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 10]`

Out[18]=



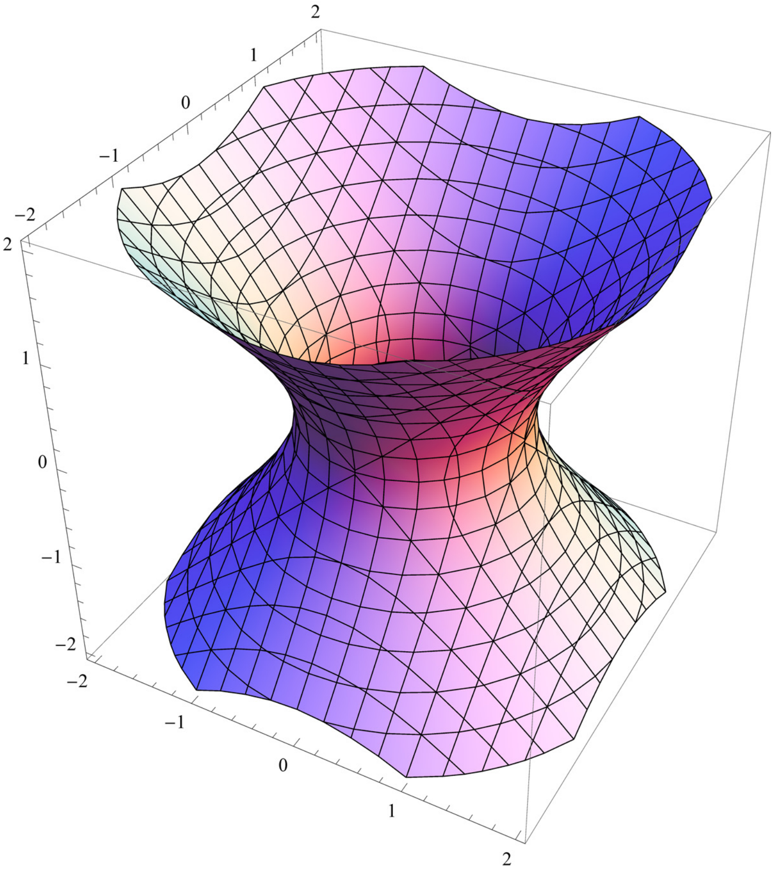
- **(I,3,2): einschaliges Hyperboloid**

In[19]:= `Q = x1^2 + x2^2 - x3^2 - 1`

Out[19]= $x_1^2 + x_2^2 - x_3^2 - 1$

In[20]:= `ContourPlot3D[Q == 0, {x1, -2, 2}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 10]`

Out[20]=



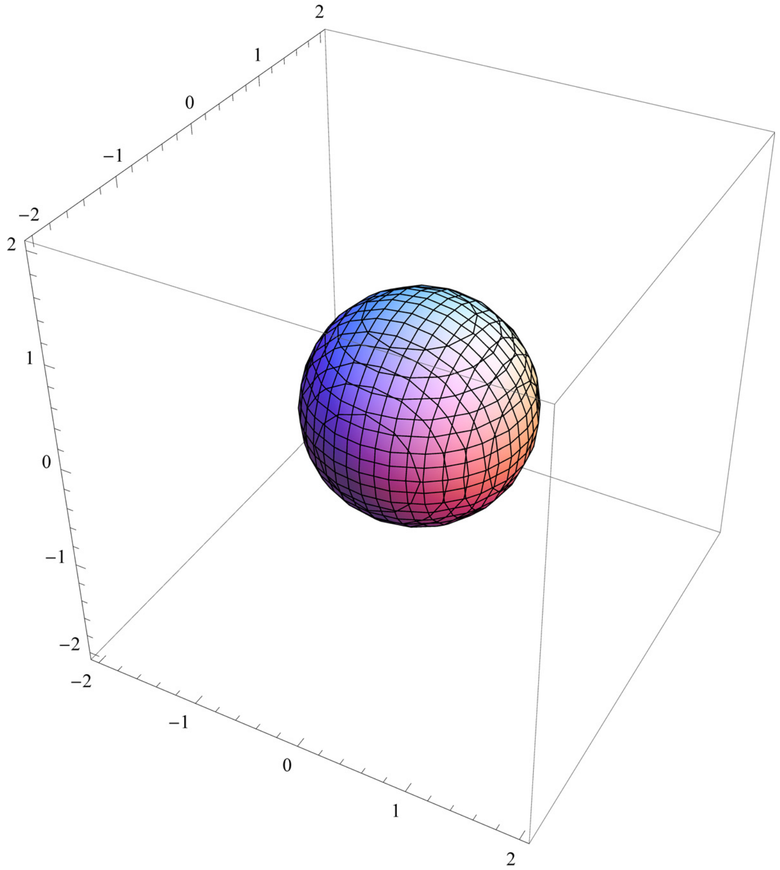
- **(I,3,3): Ellipsoid**

In[21]:= $Q = x_1{}^2 + x_2{}^2 + x_3{}^2 - 1$

Out[21]= $x_1^2 + x_2^2 + x_3^2 - 1$

In[22]:= `ContourPlot3D[Q == 0, {x1, -2, 2}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 10]`

Out[22]=



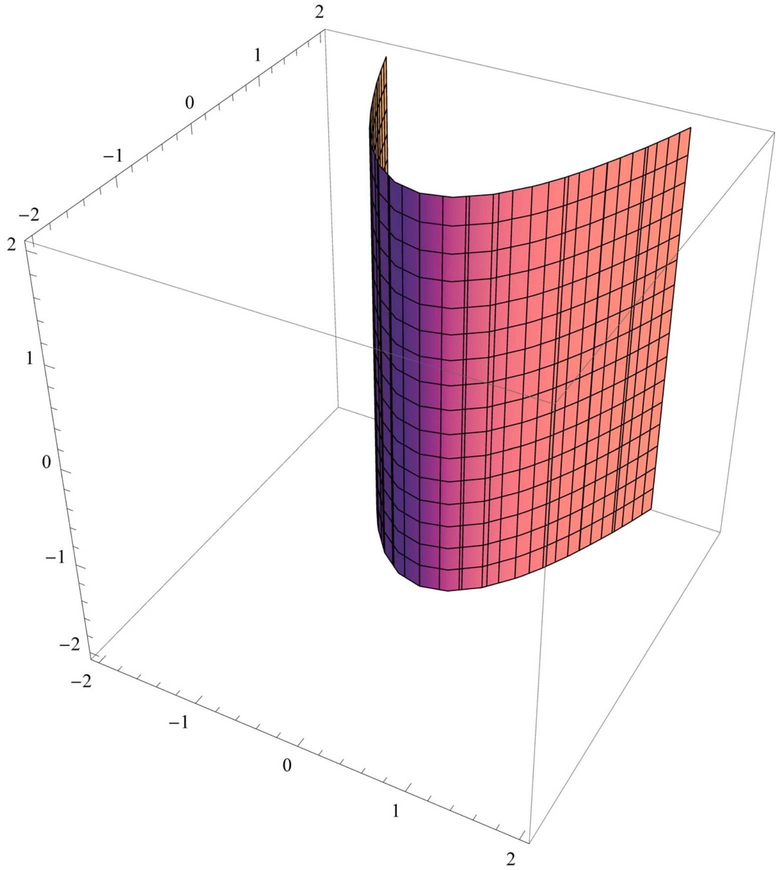
- **(II,1,1): Parabelzylinder**

In[23]:= `Q = x1^2 - x2`

Out[23]= $x_1^2 - x_2$

In[24]:=
```
ContourPlot3D[Q == 0, {x1, -2, 2}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 10]
```

Out[24]=



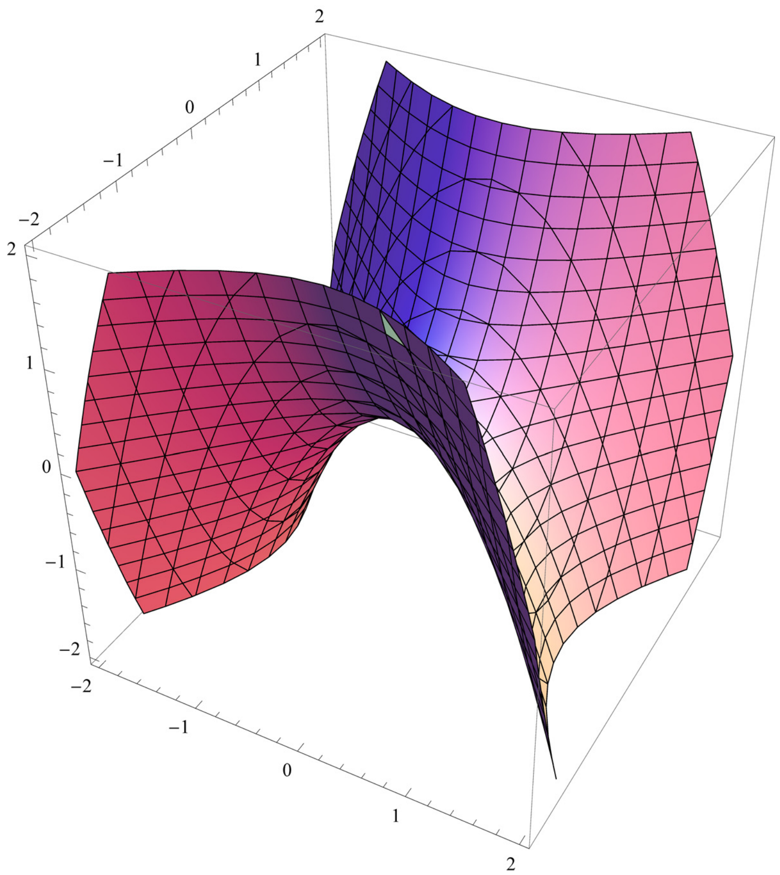
- **(II,2,1): hyperbolisches Paraboloid**

In[25]:=
```
Q = x1^2 - x2^2 + x3
```

Out[25]= $x_1^2 - x_2^2 + x_3$

In[26]:= `ContourPlot3D[Q == 0, {x1, -2, 2}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 10]`

Out[26]=



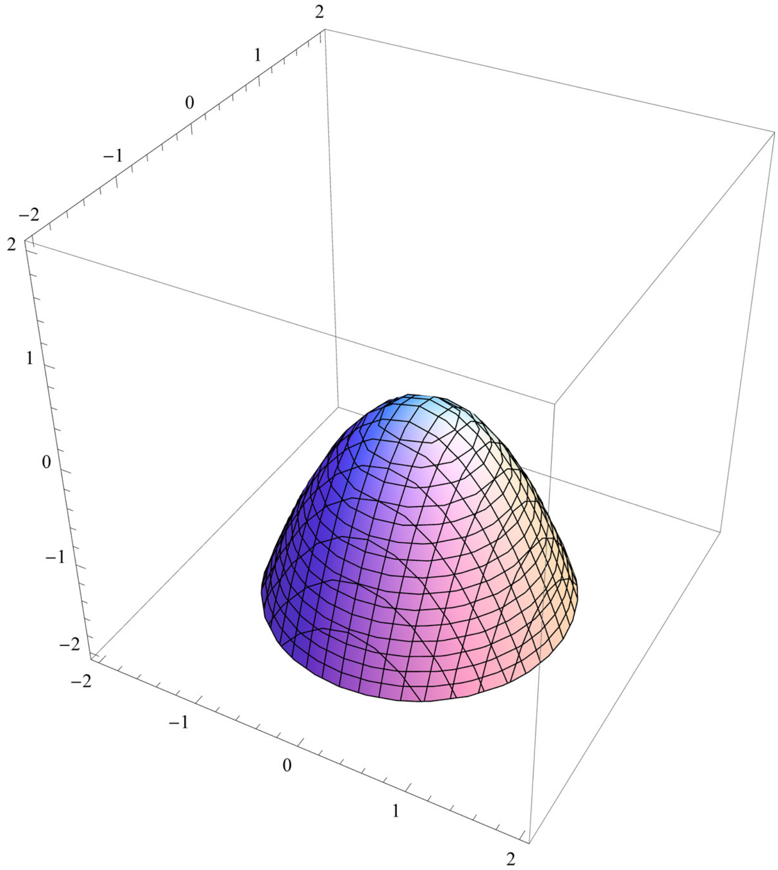
- **(II,2,2): elliptisches Paraboloid**

In[27]:= `Q = x1^2 + x2^2 + x3`

Out[27]= $x_1^2 + x_2^2 + x_3$

In[28]:= `ContourPlot3D[Q == 0, {x1, -2, 2}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 10]`

Out[28]=



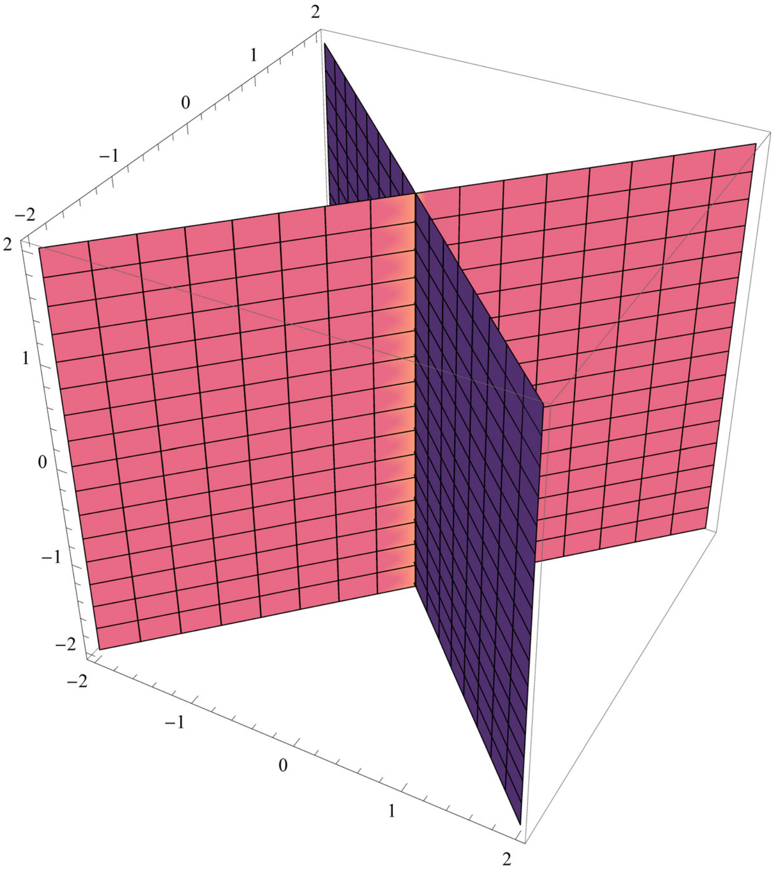
- **(III,2,1): 2 Ebenen**

In[29]:= `Q = x1^2 - x2^2`

Out[29]= $x_1^2 - x_2^2$

In[30]:= `ContourPlot3D[Q == 0, {x1, -2, 2}, {x2, -2, 2}, {x3, -2, 2}, PlotPoints → 10]`

Out[30]=



- **(III,3,2): Doppelkegel**

In[31]:= $Q = x_1{}^2 + x_2{}^2 - x_3{}^2$

Out[31]= $x_1^2 + x_2^2 - x_3^2$

In[32]:=
```
ContourPlot3D[Q == 0, {x₁, -2, 2}, {x₂, -2, 2}, {x₃, -2, 2}, PlotPoints → 10]
```

Out[32]=