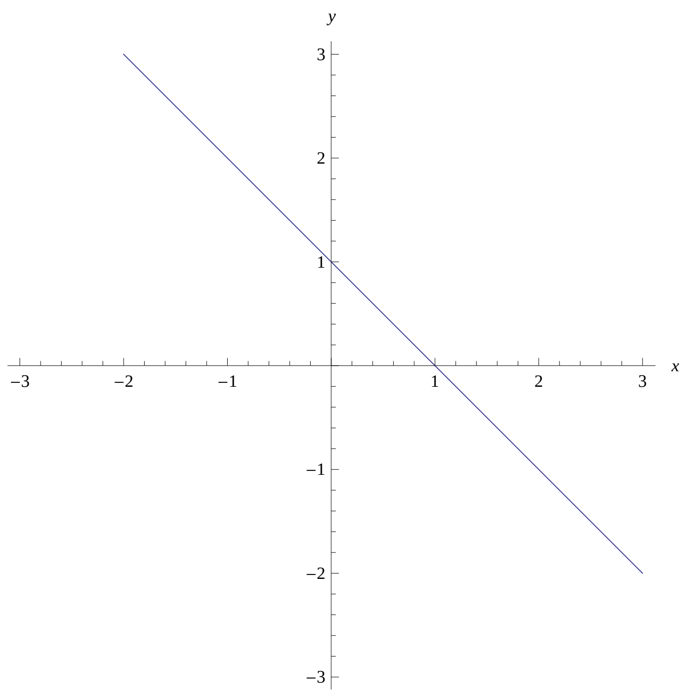
Multimi remarcabile in plan

$\mathbb{R}^2 = \{(x, y) \mid x, y \in \mathbb{R}\}$

Dreapta in plan

$D = \{(x, y) \in \mathbb{R}^2 \mid ax + by + c = 0\}$, unde $a, b, c \in \mathbb{R}$ constante

```
ContourPlot[x + y - 1 == 0, {x, -3, 3}, {y, -3, 3}, Frame → None, Axes → True, AxesLabel → Automatic]
```



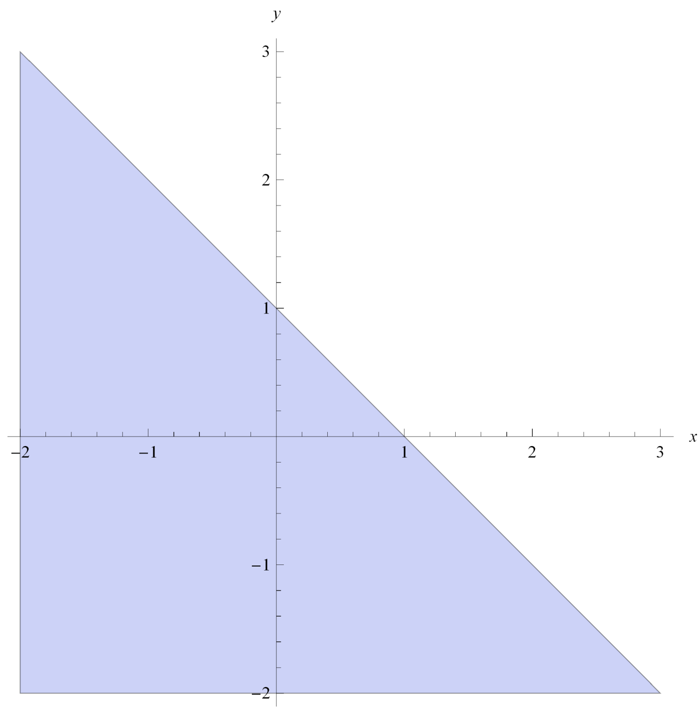
Semiplane inchise delimitate de o dreapta

$$D_{-} = \left\{ (x, y) \in \mathbb{R}^2 \;\middle|\; ax + by + c \le 0 \right\}$$

$$D_{+} = \left\{ (x, y) \in \mathbb{R}^2 \;\middle|\; ax + by + c \ge 0 \right\},\ \text{unde } a, b, c \in \mathbb{R} \text{ constante}$$

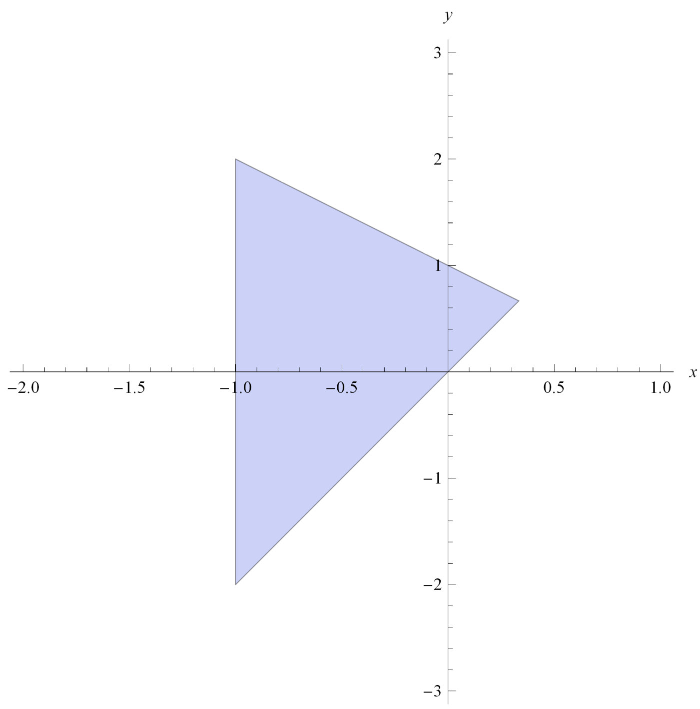
$$D_{-} \bigcap D_{+} = D$$

```
RegionPlot[x + y - 1 ≤ 0, {x, -2, 3}, {y, -2, 3}, Frame → None, Axes → True, AxesLabel → Automatic]
```



Ex : $T = \{(x, y) \in \mathbb{R}^2 \mid x + y \le 1,\ y - 2x \ge 0,\ x + 1 \ge 0\}$

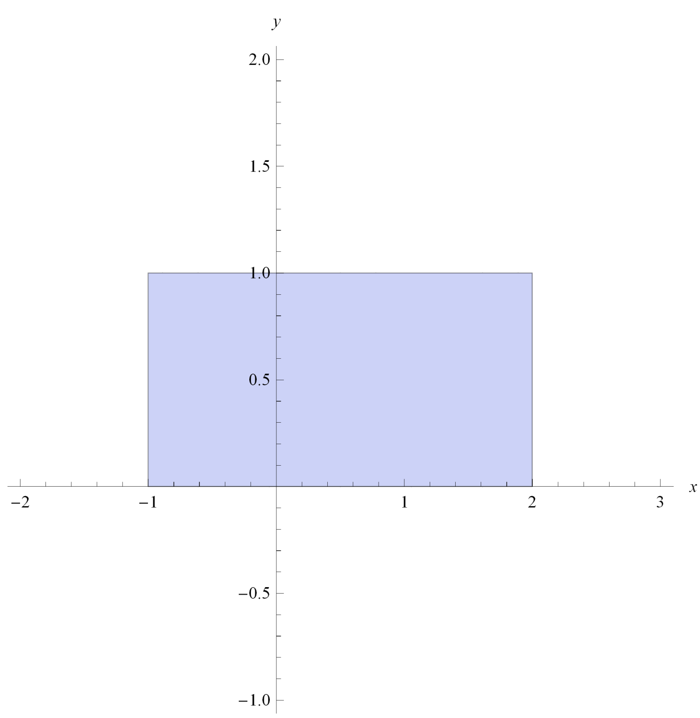
```
RegionPlot[x + y ≤ 1 && y - 2 x ≥ 0 && x + 1 ≥ 0, {x, -2, 1}, {y, -3, 3},
 PlotPoints → 10, Frame → None, Axes → True, AxesLabel → Automatic]
```



Regiunea dreptunghiulara [a, b] x [c, d]

$R = \{(x, y) \in \mathbb{R}^2 \mid a \le x \le b,\ c \le y \le d\}$

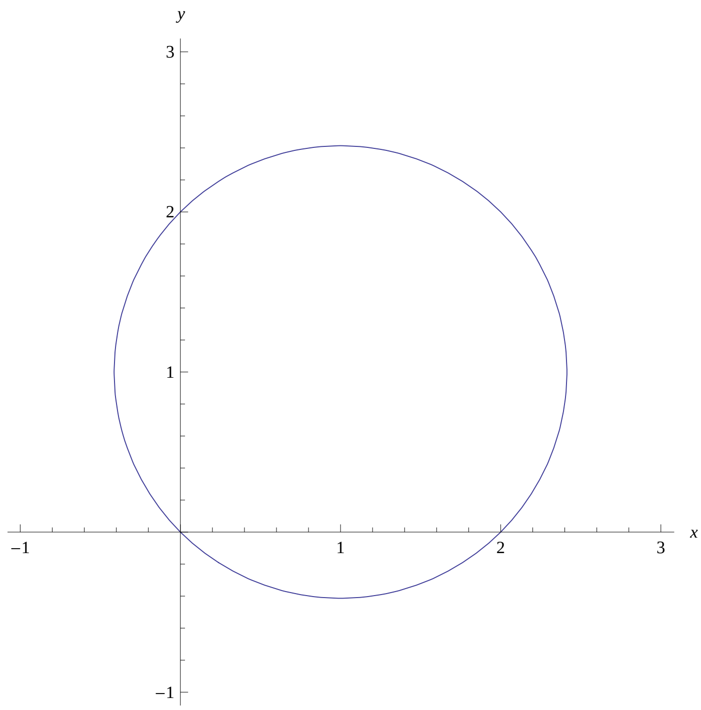
```
RegionPlot[-1 ≤ x ≤ 2 && 0 ≤ y ≤ 1, {x, -2, 3}, {y, -1, 2},
 PlotPoints → 10, Frame → None, Axes → True, AxesLabel → Automatic]
```



Cerc de centru (x_0, y_0) si raza r

$$C = \left\{ (x, y) \in \mathbb{R}^2 \;\middle|\; (x - x_0)^2 + (y - y_0)^2 = r^2 \right\}$$

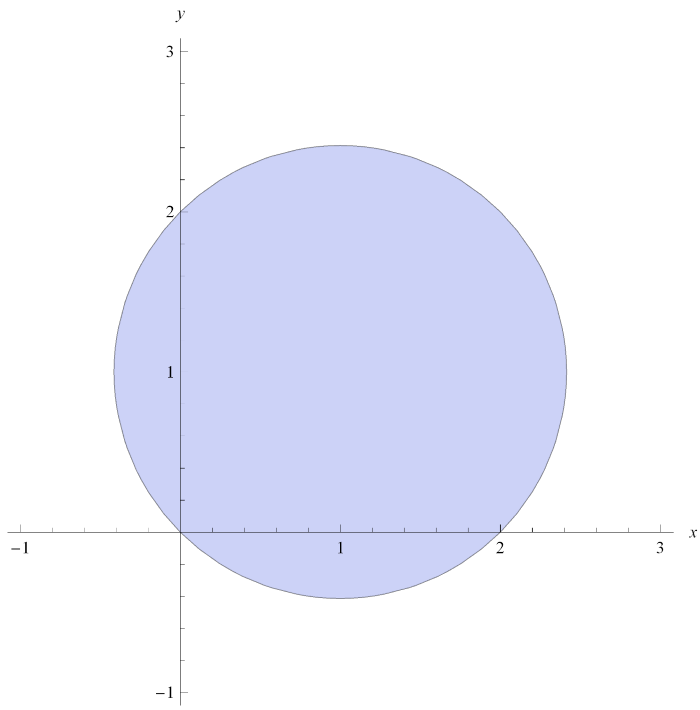
```
ContourPlot[(x - 1)^2 + (y - 1)^2 == 2, {x, -1, 3},
 {y, -1, 3}, Frame → None, Axes → True, AxesLabel → Automatic]
```



Disc inchis de centru (x_0, y_0) si raza r

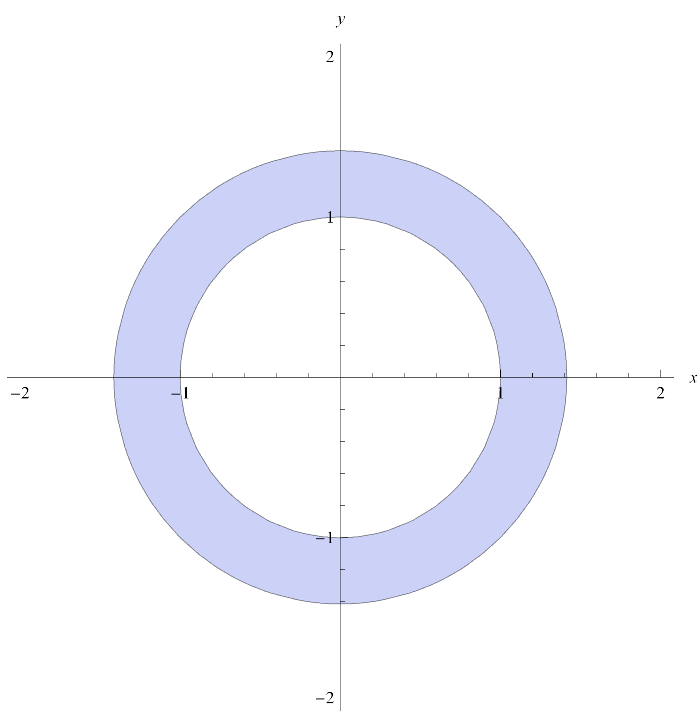
$$C_- = \left\{ (x, y) \in \mathbb{R}^2 \;\middle|\; (x - x_0)^2 + (y - y_0)^2 \leq r^2 \right\}$$

```
RegionPlot[(x - 1)^2 + (y - 1)^2 ≤ 2, {x, -1, 3}, {y, -1, 3},
 PlotPoints → 10, Frame → None, Axes → True, AxesLabel → Automatic]
```



Ex : $C = \left\{ (x, y) \in \mathbb{R}^2 \;\middle|\; 1 \leq x^2 + y^2 \leq 2 \right\}$

```
RegionPlot[1 ≤ x^2 + y^2 ≤ 2, {x, -2, 2}, {y, -2, 2},
 PlotPoints → 10, Frame → None, Axes → True, AxesLabel → Automatic]
```



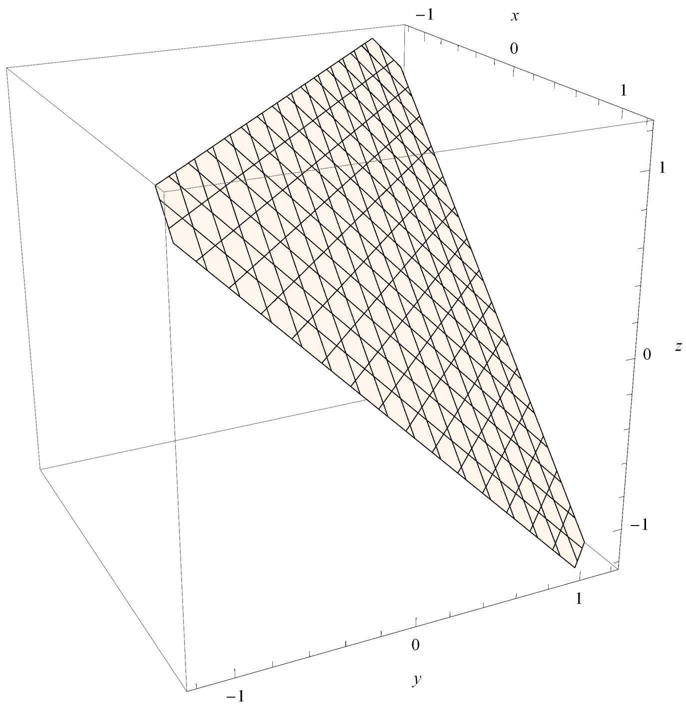
Multimi remarcabile in spatiu

$\mathbb{R}^3 = \{(x, y, z) \mid x, y, z \in \mathbb{R}\}$

Plan in spatiu

$P = \left\{(x, y, z) \in \mathbb{R}^3 \;\middle|\; ax + by + cz + d = 0\right\}$, unde $a, b, c, d \in \mathbb{R}$ constante

```
ContourPlot3D[x + y + z - 1 == 0, {x, -1.2, 1.2}, {y, -1.2, 1.2},
 {z, -1.2, 1.2}, AxesLabel → Automatic, BoxRatios → Automatic]
```

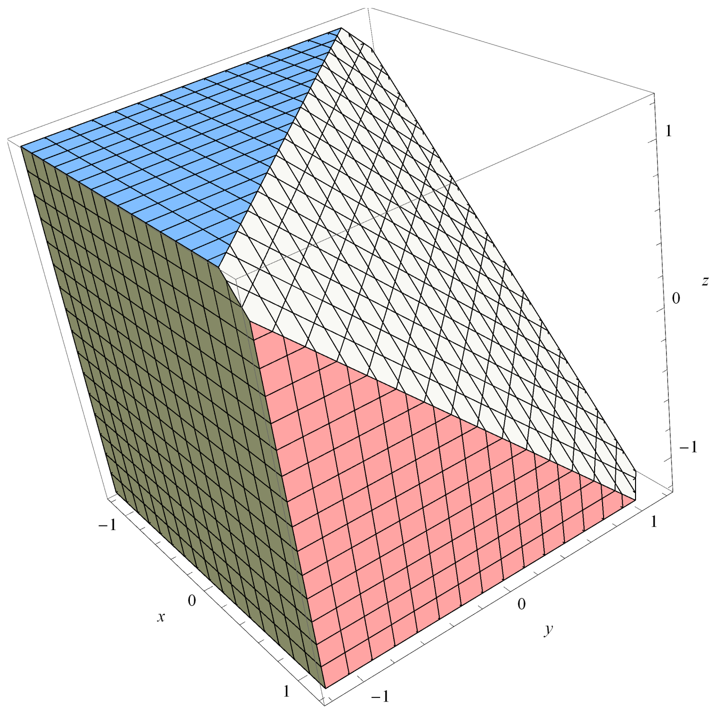


Semispatii inchise delimitate de un plan

$$P_{-} = \left\{ (x, y, z) \in \mathbb{R}^3 \;\middle|\; ax + by + cz + d \le 0 \right\}$$

$$P_{+} = \left\{ (x, y, z) \in \mathbb{R}^3 \;\middle|\; ax + by + cz + d \ge 0 \right\}$$

```
RegionPlot3D[x + y + z - 1 ≤ 0, {x, -1.2, 1.2}, {y, -1.2, 1.2}, {z, -1.2, 1.2}, AxesLabel → Automatic]
```

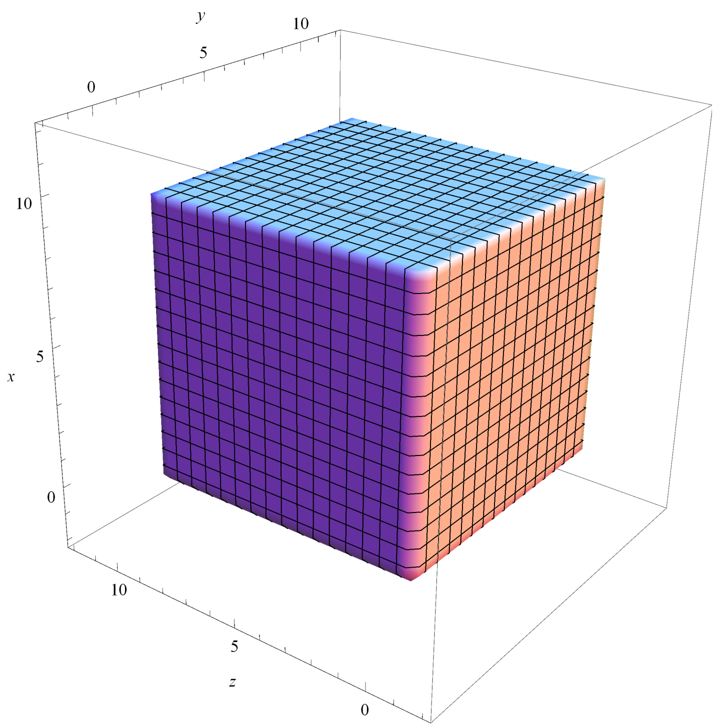


Regiunea paralelipipedica [a, b] x[c, d] x[e, f]

$$R = \left\{ (x, y, z) \in \mathbb{R}^3 \;\middle|\; a \le x \le b,\ c \le y \le d,\ e \le z \le f \right\}$$

In[17]:=
```
RegionPlot3D[0 ≤ x ≤ 10 && 0 ≤ y ≤ 10 && 0 ≤ z ≤ 10, {x, -2, 12},
  {y, -2, 12}, {z, -2, 12}, AxesLabel → Automatic, PlotPoints → 50]
```

Out[17]=



Sfera de centru (x_0, y_0, z_0) si raza r

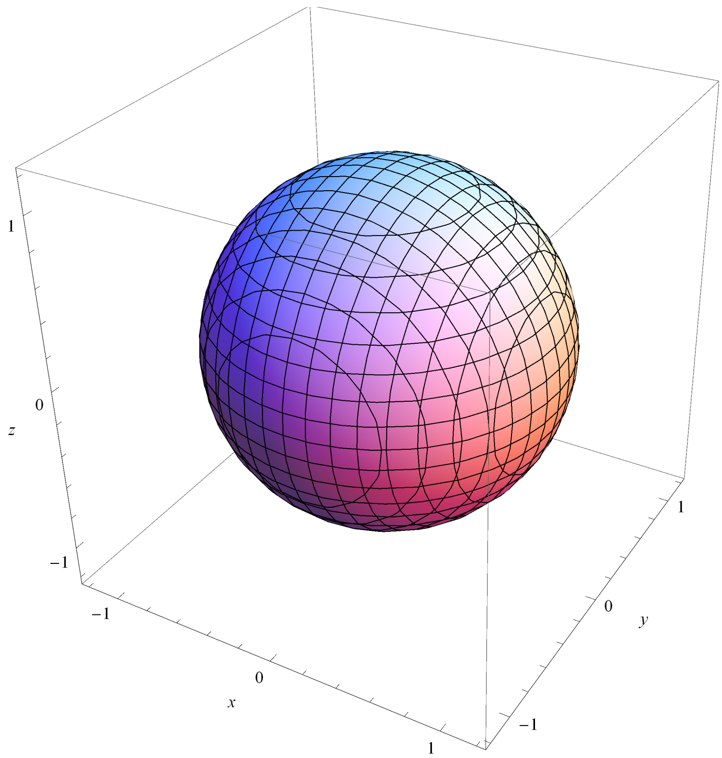
$$S = \{(x, y, z) \in \mathbb{R}^3 \mid (x - x_0)^2 + (y - y_0)^2 + (z - z_0)^2 = r^2\}$$

Bila inchisa de centru (x_0, y_0, z_0) si raza r

$$\overline{B} = \{(x, y, z) \in \mathbb{R}^3 \mid (x - x_0)^2 + (y - y_0)^2 + (z - z_0)^2 \leq r^2\}$$

In[11]:=
```
ContourPlot3D[x^2 + y^2 + z^2 == 1, {x, -1.2, 1.2},
 {y, -1.2, 1.2}, {z, -1.2, 1.2}, AxesLabel → Automatic]
```

Out[11]=



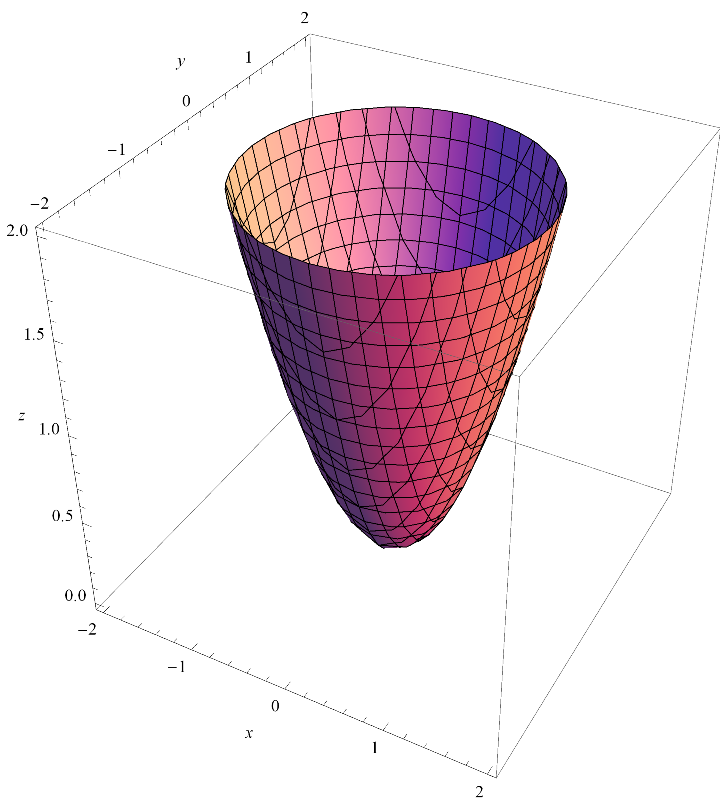
Paraboloid eliptic : $P_e = \left\{(x, y, z) \in \mathbb{R}^3 \mid z = \frac{x^2}{p} + \frac{y^2}{q}\right\}$

Paraboloid hiperbolic : $P_h = \left\{(x, y, z) \in \mathbb{R}^3 \mid z = \frac{x^2}{p} - \frac{y^2}{q}\right\}$,

unde $p, q > 0$ constante

```
In[12]:= ContourPlot3D[z == x^2 + y^2, {x, -2, 2},
          {y, -2, 2}, {z, 0, 2}, AxesLabel → Automatic, BoxRatios → 1]
         ContourPlot3D[z == x^2 - y^2, {x, -1, 1}, {y, -1, 1},
          {z, -1, 1}, AxesLabel → Automatic, BoxRatios → 1]
```

Out[12]=



Out[13]=