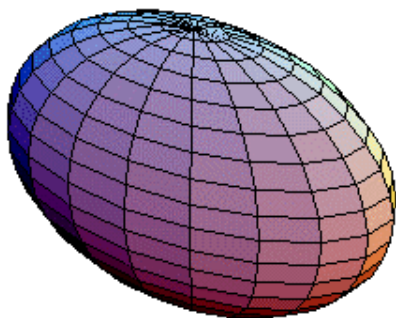


Plohe drugog reda (kvadrike)

Opća jednađba plohe drugog reda:

$$A x^2 + B y^2 + C z^2 + D y z + E x z + F x y + G x + H y + I z + K = 0$$

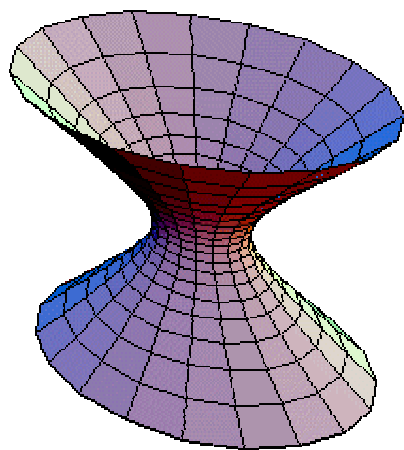
Elipsoid



Jednađba

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

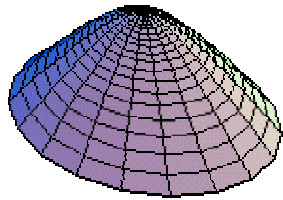
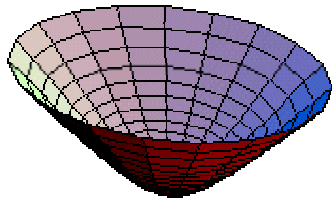
Jednoplolni hiperboloid



Jednađba

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$$

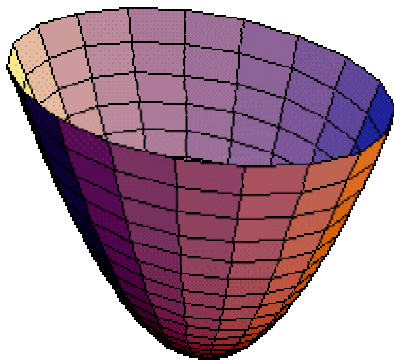
Dvoplohni hiperboloid



Jednadžba

$$-\frac{x^2}{a^2} - \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

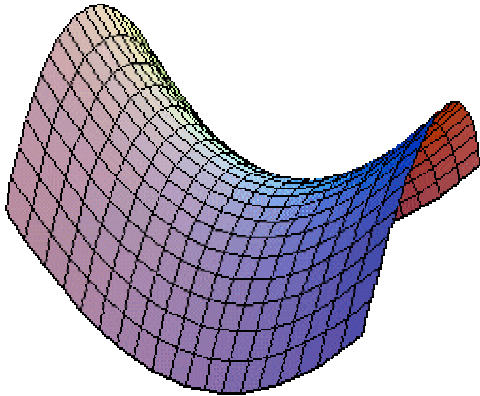
Eliptički paraboloid



Jednadžba

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2 p z$$

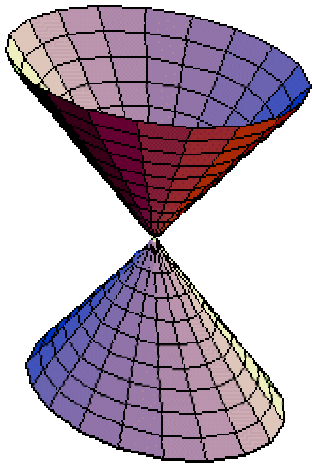
Hiperbolički paraboloid



Jednadžba

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 2 p z$$

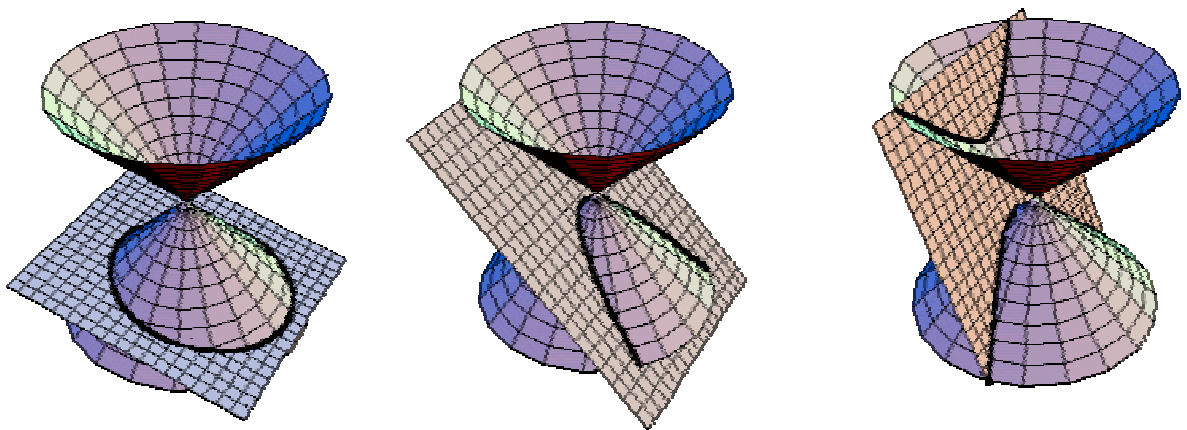
Konus drugog reda



Jednadžba

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 0$$

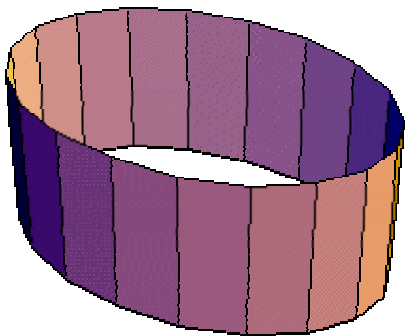
Napomena



Siječenjem rotacionog konusa (sa $a = b$) ravninama možemo dobiti sve krivulje drugog reda. Zato se krivulje drugog reda katkada nazivaju "čunjosječnice" (konus = čunj).

Cilindri drugog reda

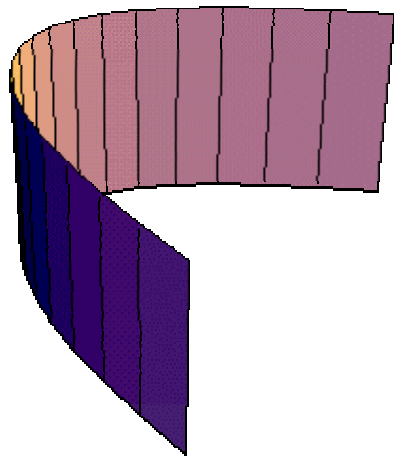
Eliptički cilindar



Jednadžba

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

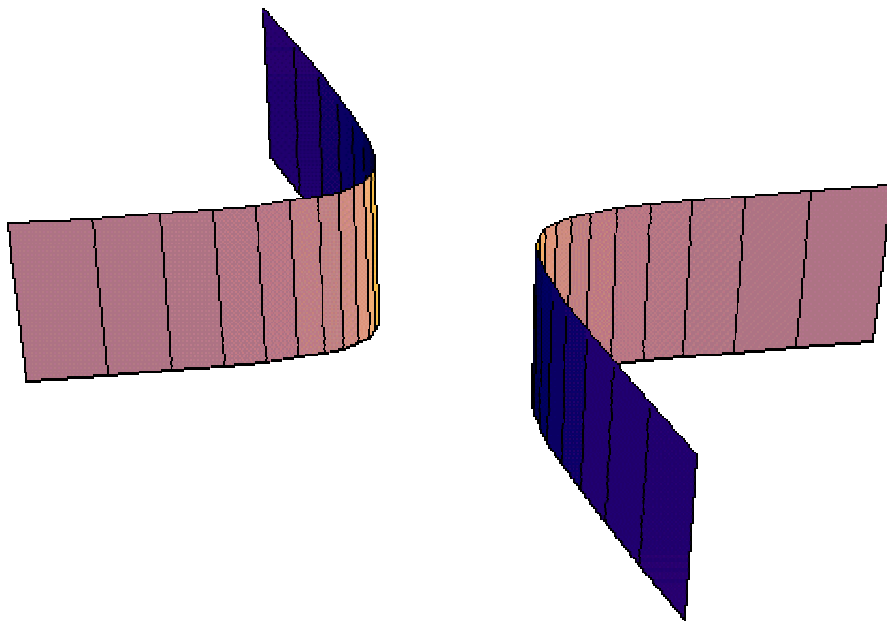
Parabolički cilindar



Jednadžba

$$y^2 = 2px$$

Hiperbolički cilindar

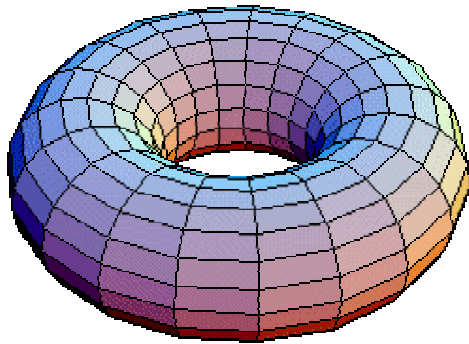


Jednadžba

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

Još dvije plohe

Torus

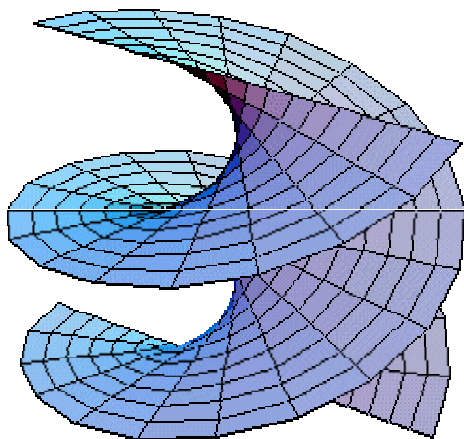


Torus je algebarska ploha četvrtog reda.

Jednadžba

$$(x^2 + y^2 + z^2 - a^2 - b^2)^2 - 4a^2(b^2 - z^2) = 0$$

Helikoid



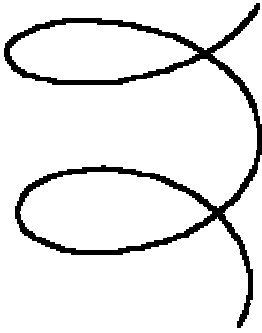
Helikoid je transcendentna ploha, tj. ne može se dobiti kao skup nultočka polinoma u tri varijable.

Jednadžba

$$y - x \operatorname{tg} \left(\frac{z}{c} \right) = 0$$

Nekoliko prostornih krivulja

Cilindrična spirala

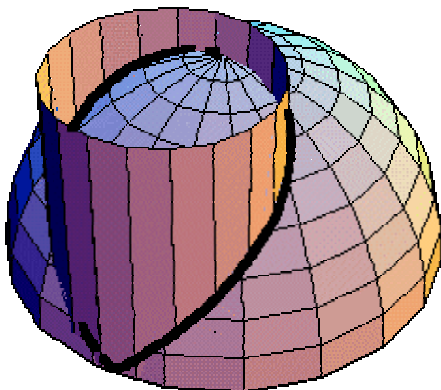


Cilindrična spirala nastaje kao presjek helikoida i kružnog cilindra, odnosno dvaju sinusoidalnih cilindara.

Jednadžbe

$$\begin{aligned} x^2 + y^2 = a^2 & \quad x = a \cos \left(\frac{z}{c} \right) \\ & \quad \text{ili} \\ y - x \operatorname{tg} \left(\frac{z}{c} \right) = 0 & \quad y = a \sin \left(\frac{z}{c} \right) \end{aligned}$$

Vivianijev prozor

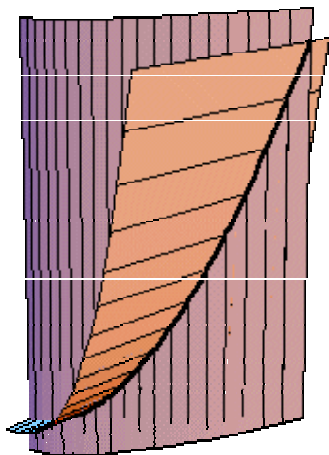


Vivianijev prozor je presjek sfere i kružnog cilindra.

Jednadžbe

$$x^2 + y^2 + z^2 = R^2$$
$$\left(x - \frac{R}{2}\right)^2 + y^2 = \frac{R^2}{4}$$

Kubna parabola



Kubna parabola je presjek parabolickog i kubnog cilindra.

Jednadžbe

$$y = x^2$$

$$z = x^3$$