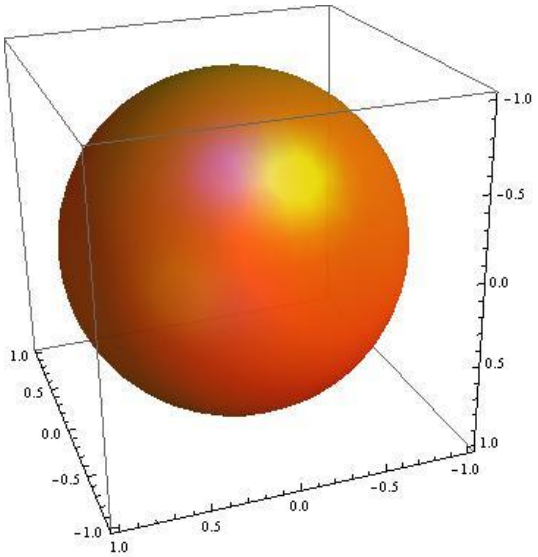
QADRATIC SURFACES

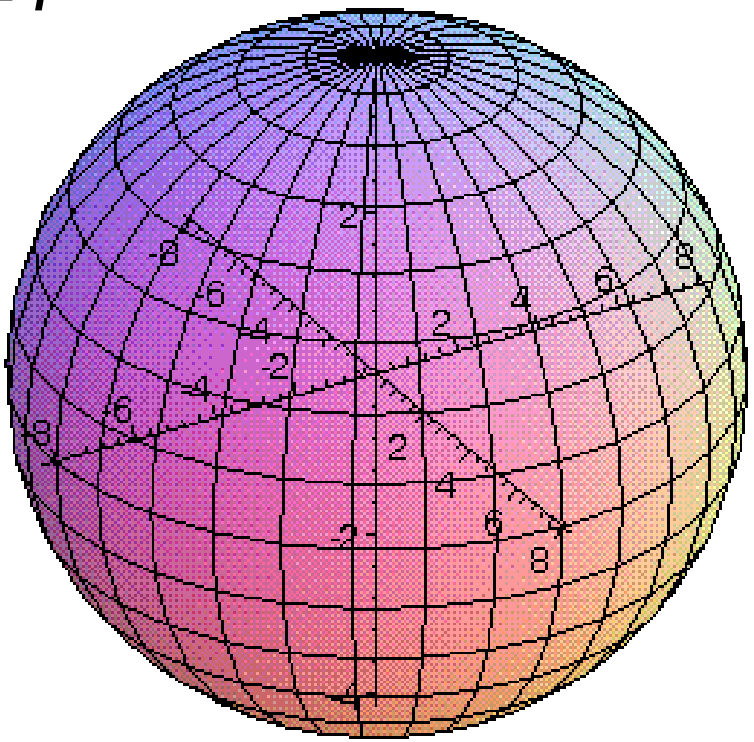
SPHERE

$$x^2 + y^2 + z^2 = r^2, r \neq 0, S = [0,0,0]$$

$$(x-m)^2 + (y-n)^2 + (z-p)^2 = r^2$$

$$r \neq 0, S = [m, n, p]$$

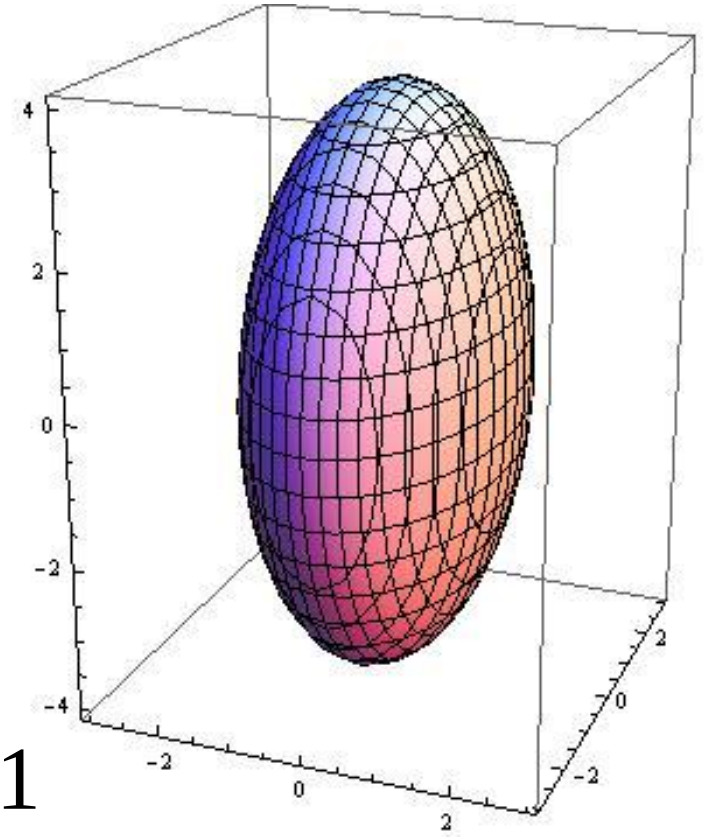




ELLIPSOID

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

$$a,b,c\neq 0, S=[0,0,0]$$

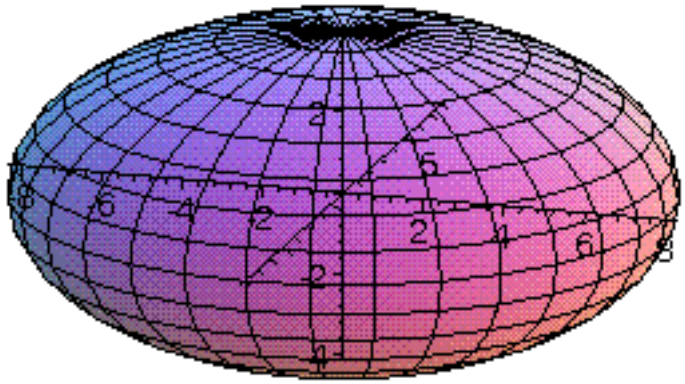


$$\frac{(x-m)^2}{a^2}+\frac{(y-n)^2}{b^2}+\frac{(z-p)^2}{c^2}=1$$

$$a,b,c\neq 0, S=[m,n,p]$$

$$a=b\vee a=c\vee b=c$$

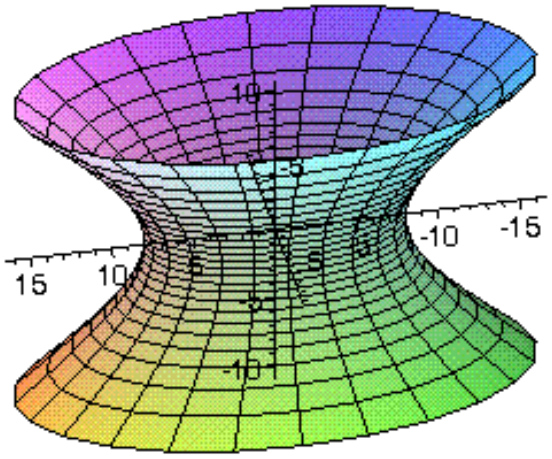
ellipsoid of revolution



HYPERBOLOID of 1 SHEET

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

$$a,b,c\neq 0, S=[0,0,0]$$

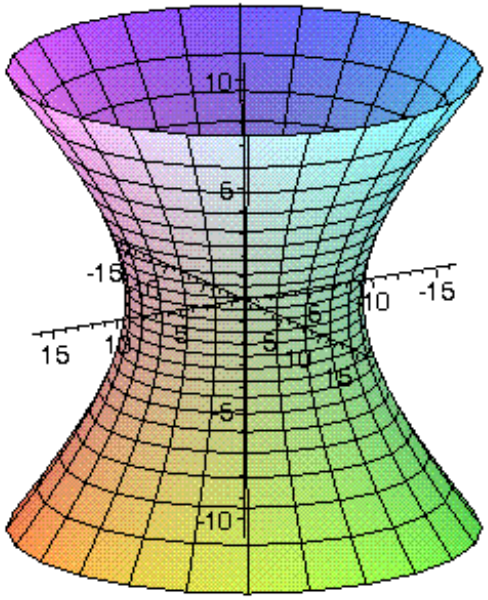


$$\frac{(x-m)^2}{a^2}+\frac{(y-n)^2}{b^2}-\frac{(z-p)^2}{c^2}=1$$

$$a,b,c\neq 0, S=[m,n,p]$$

$$a=b\vee a=c\vee b=c$$

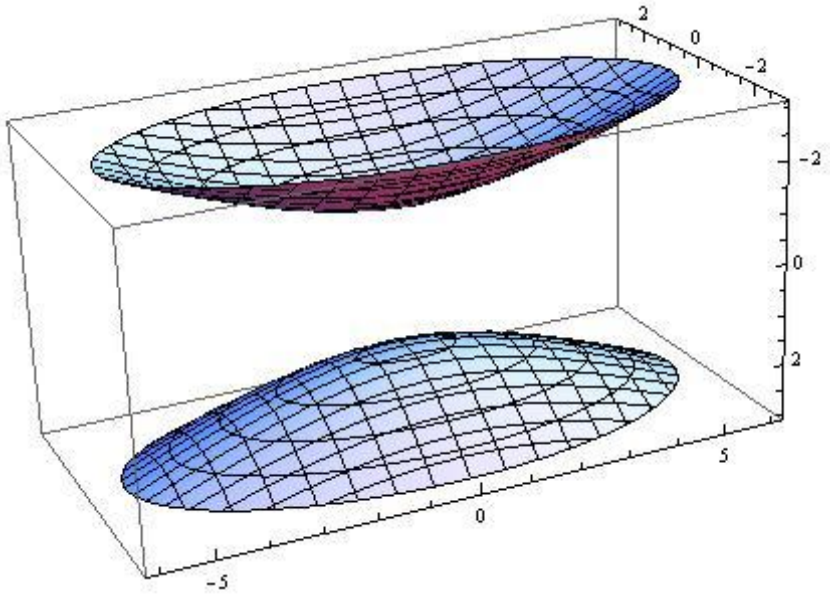
hyperboloid of revolution



HYPERBOLOID of 2 SHEETS

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

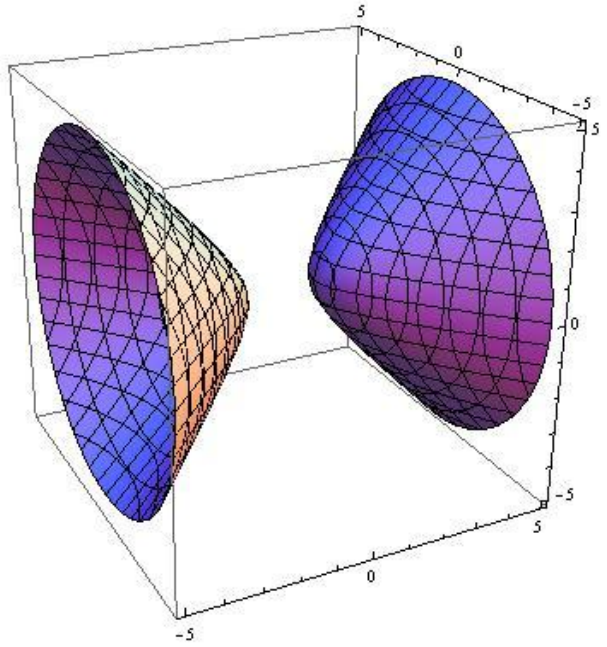
$$a,b,c\neq 0, S=[0,0,0]$$



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

$$a,b\neq 0, S=[0,0,0]$$

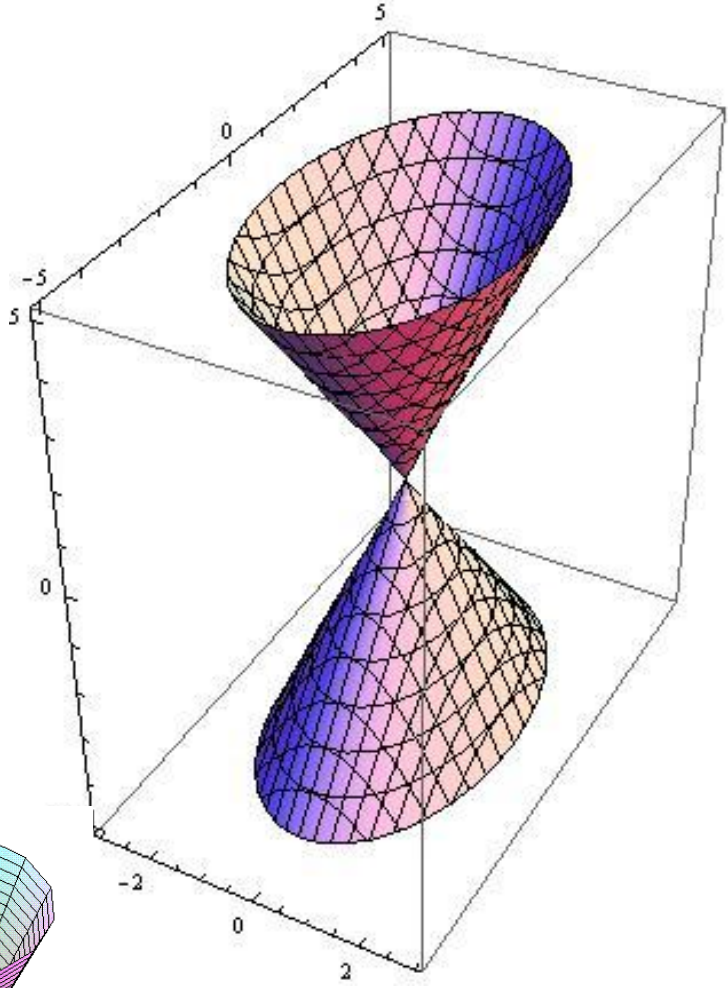
hyperboloid of revolution



ELLIPTICAL CONICAL SURFACE

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

$$a,b,c\neq 0, V=[0,0,0]$$

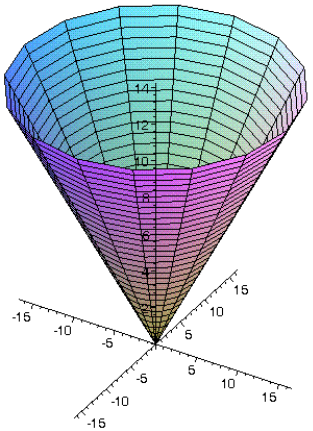


$$\frac{(x-m)^2}{a^2}+\frac{(y-n)^2}{b^2}-\frac{(z-p)^2}{c^2}=0$$

$$a,b,c\neq 0, V=[m,n,p]$$

$$a=b$$

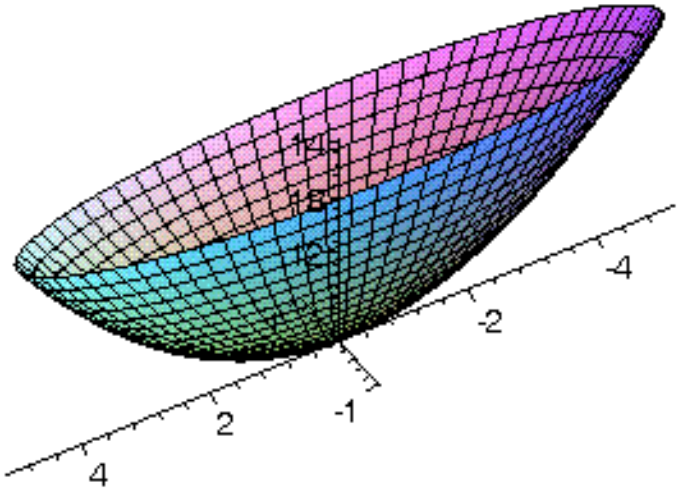
conical surface of revolution



ELLIPTICAL PARABOLOID

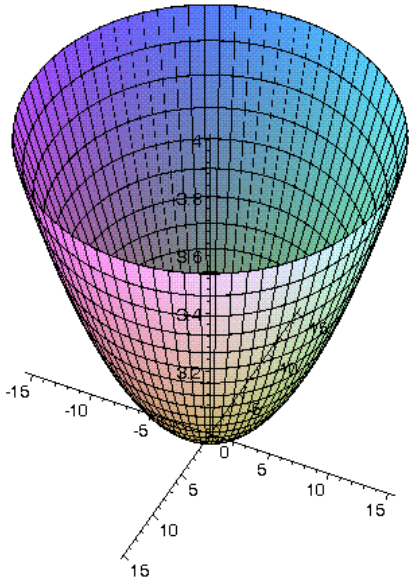
$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=z$$

$$a,b\neq 0, V=[0,0,0]$$



$$\frac{(x-m)^2}{p}+\frac{(y-n)^2}{q}=2(z-p)$$

$$V=[m,n,p]$$



a = *b*, *p* = *q*
paraboloid of revolution

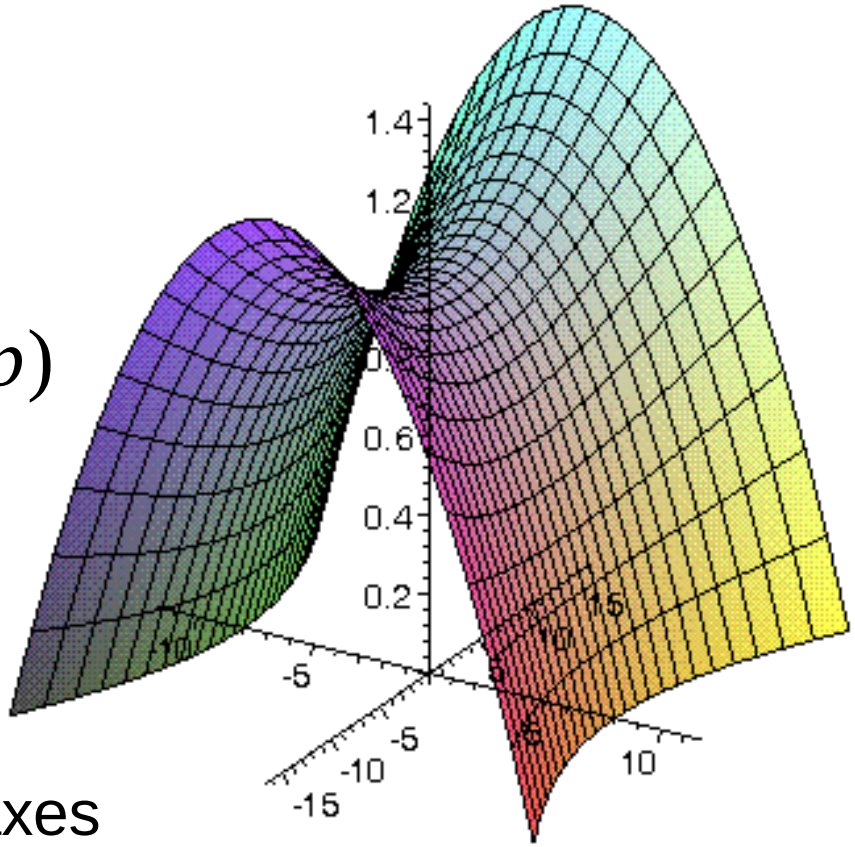
HYPERBOLICAL PARABOLOID

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

$$a, b \neq 0, V = [0,0,0]$$

$$\frac{(x-m)^2}{p} - \frac{(y-n)^2}{q} = 2(z-p)$$

$$V = [m, n, p]$$

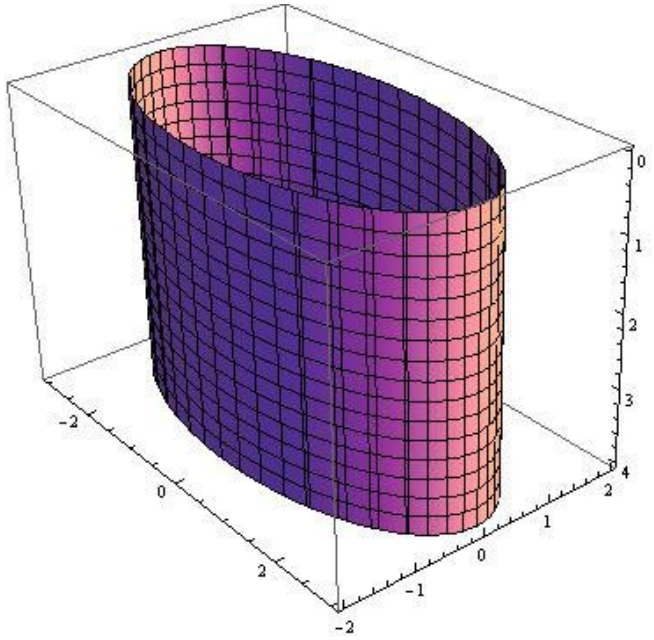


a = *b*, *p* = *q*
hyperbolic paraboloid of equal axes

ELLIPTICAL CYLINDRICAL SURFACE

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

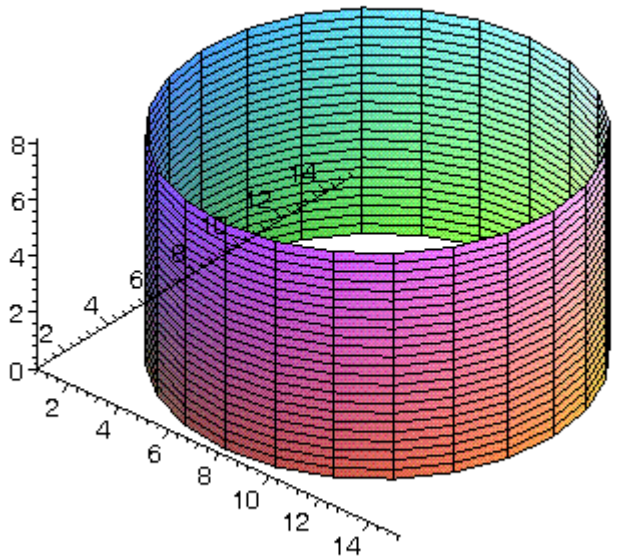
$$a,b\neq 0$$



$$\frac{(x-m)^2}{a^2}+\frac{(y-n)^2}{b^2}=1$$

$$a,b\neq 0$$

$$a=b$$



cylindrical surface of revolution

HYPERBOLICAL CYLINDRICAL SURFACE

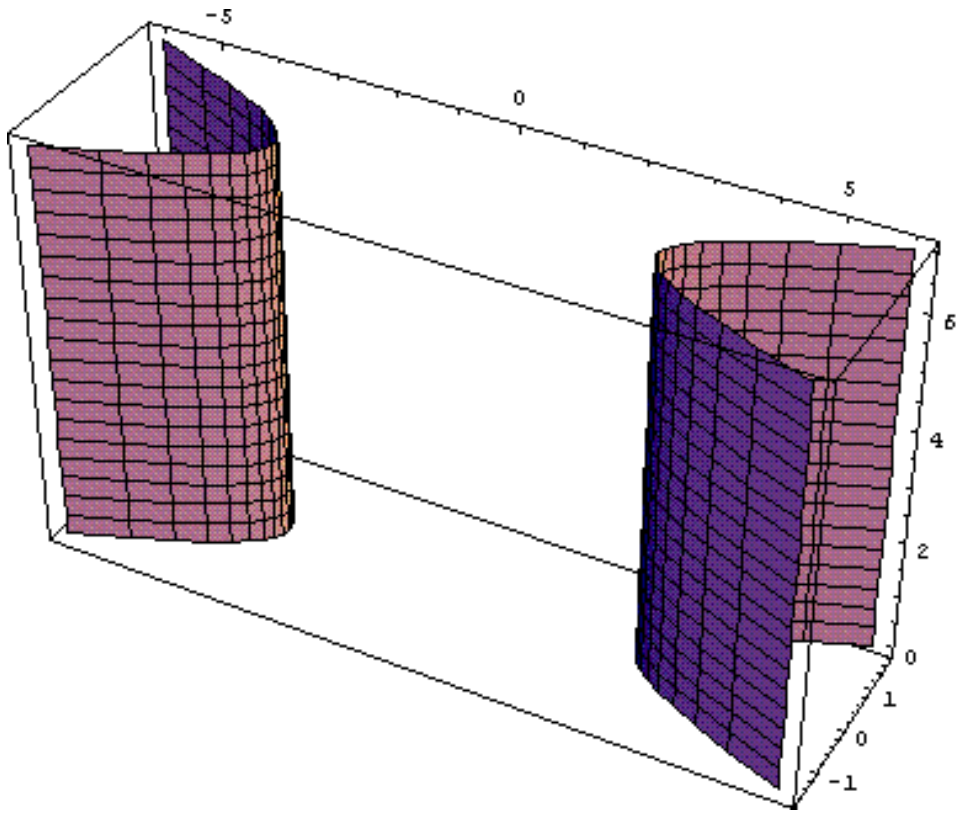
$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

$$a, b \neq 0$$

$$\frac{(x-m)^2}{a^2} - \frac{(y-n)^2}{b^2} = 1$$

$$a, b \neq 0$$

$$a = b$$

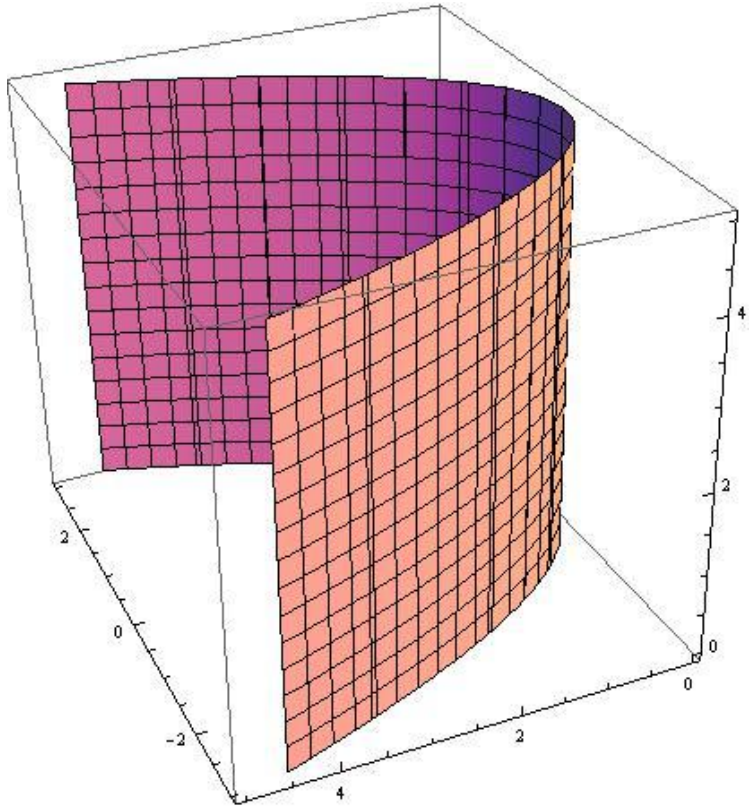


hyperbolical cylindrical surface of equal axes

PARABOLICAL CYLINDRICAL SURFACE

$$y^2 = 2px$$

$$p \neq 0$$



$$(x-n)^2 = 2p(y-m)$$

$$p \neq 0$$