

```

In[1]:= a = 2;
        b = 1;
        c = 3;

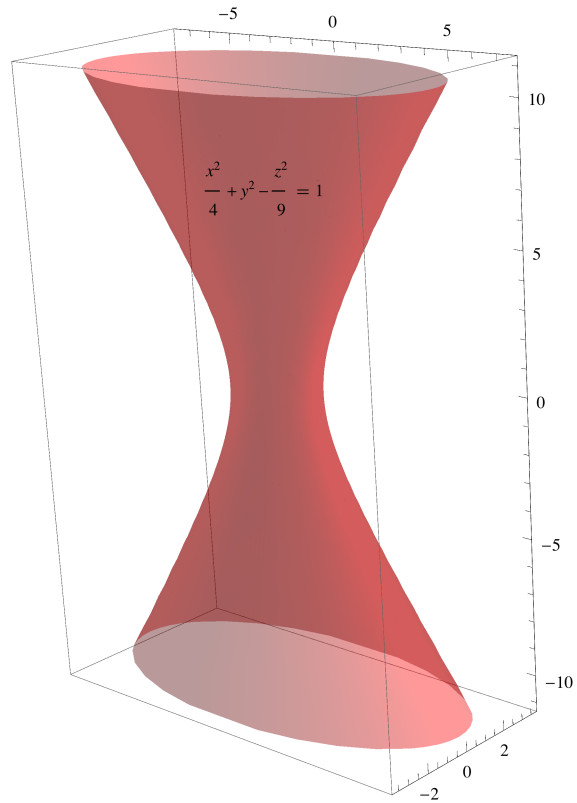
In[4]:= QH1 = ParametricPlot3D[
          {a Cosh[u] Cos[v], b Cosh[u] Sin[v], c Sinh[u]}, {u, -2, 2}, {v, 0, 2 Pi},
          PlotStyle -> {Red, Opacity[0.4]}, Mesh -> None, AspectRatio -> Automatic];

In[5]:= TxtH1 = Graphics3D[Text[ $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$ , {0, 0, 7}]];

In[6]:= Show[QH1, TxtH1]

```

Out[6]=



```

In[7]:= h = 3.5;

In[8]:= PlanOriz = ParametricPlot3D[{x, y, h}, {x, -a - 2, a + 2},
          {y, -b - 2, b + 2}, PlotStyle -> {Blue, Opacity[0.7]}, Mesh -> None];

In[9]:= u0 = ArcSinh[h / c];

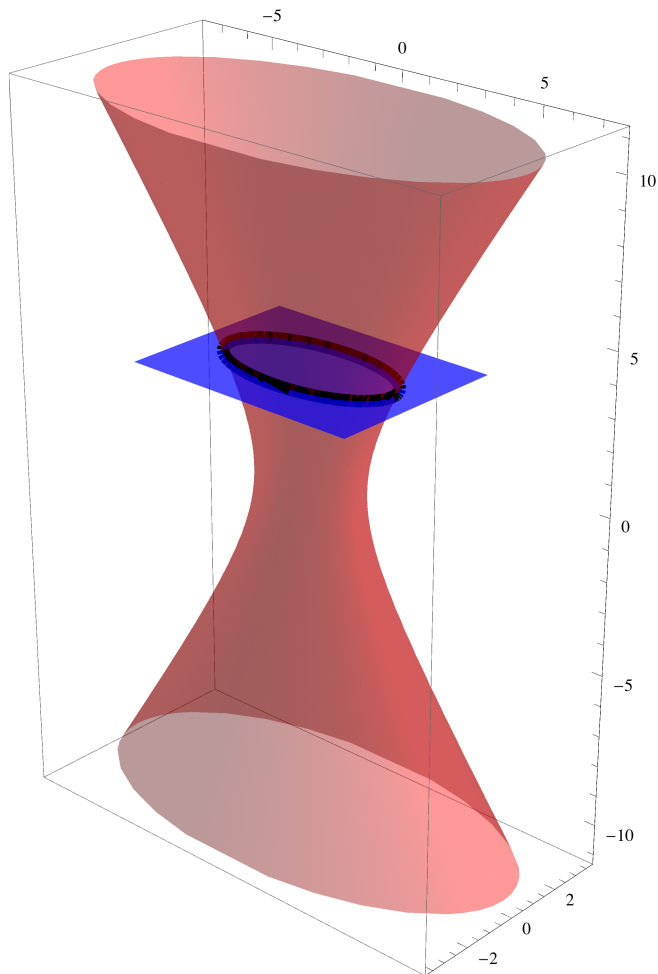
In[10]:= CurbInt = ParametricPlot3D[{a Cosh[u0] Cos[v], b Cosh[u0] Sin[v], c Sinh[u0]},
          {v, 0, 2 Pi}, PlotStyle -> {Black, Thickness[0.02]}];

```

In[13]:=

```
(* PENTRU CURBA DE INTERSECTIE: *)
Show[QH1, PlanOriz, CurbInt]
```

Out[13]=



In[14]:=

```
(*
  Vom studia intersectia cu plane verticale si vom distinge trei cazuri
*)
```

In[15]:=

```
(* Caz 1: |h| > b *)
```

In[16]:=

$$h = -b - 1; rr = \sqrt{\frac{h^2}{b^2} - 1};$$

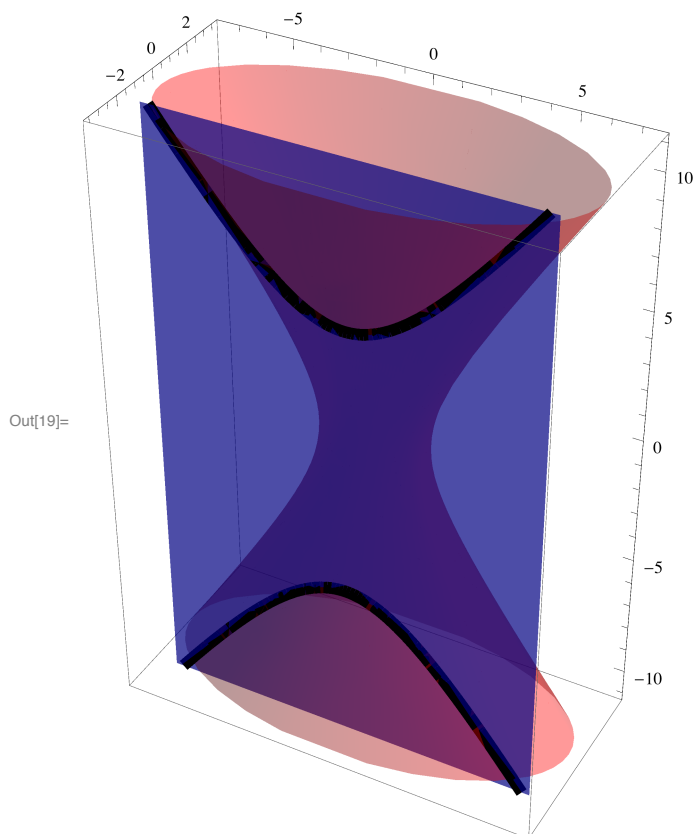
In[17]:=

```
PlanVert = ParametricPlot3D[{x, h, z}, {x, -a - 5, a + 5},
  {z, -c - 10, c + 10}, PlotStyle -> {Blue, Opacity[0.7]}, Mesh -> None];
```

In[18]:=

```
CurbInt1 = ParametricPlot3D[
  {{rr a Sinh[t], h, rr c Cosh[t]}, {rr a Sinh[t], h, -rr c Cosh[t]}},
  {t, -2, 2}, PlotStyle -> {{Black, Thickness[0.02]}}];
```

```
In[19]:= (* PENTRU CURBA DE INTERSECTIE: *)
Show[QH1, PlanVert, CurbInt1]
```



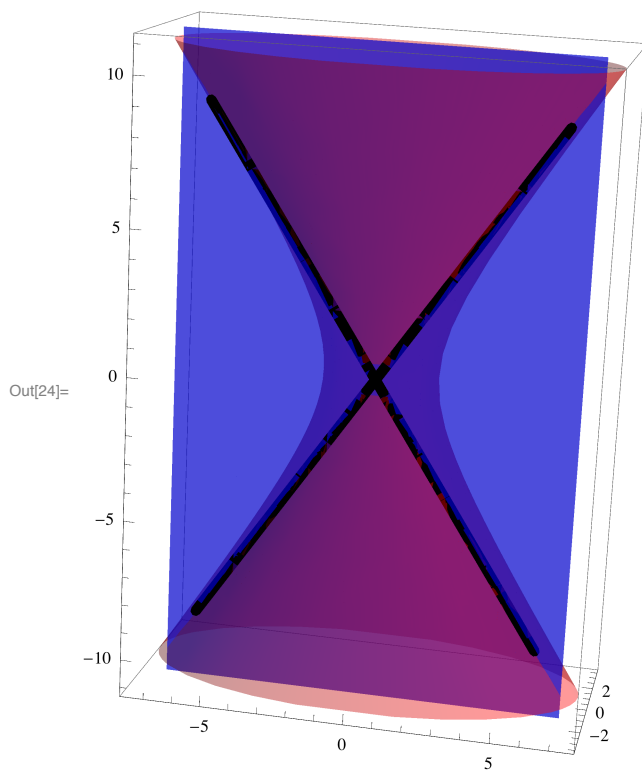
```
In[20]:= (* Caz 2: |h| = b *)
```

```
In[21]:= h = -b;
```

```
In[22]:= PlanVert = ParametricPlot3D[{x, h, z}, {x, -a - 5, a + 5},
  {z, -c - 10, c + 10}, PlotStyle -> {Blue, Opacity[0.7]}, Mesh -> None];
```

```
In[23]:= CurbInt2 = ParametricPlot3D[{a t, h, c t}, {a t, h, -c t},
  {t, -3, 3}, PlotStyle -> {{Black, Thickness[0.02]}}];
```

```
In[24]:= (* PENTRU CURBA DE INTERSECTIE: *)
Show[QH1, PlanVert, CurbInt2]
```



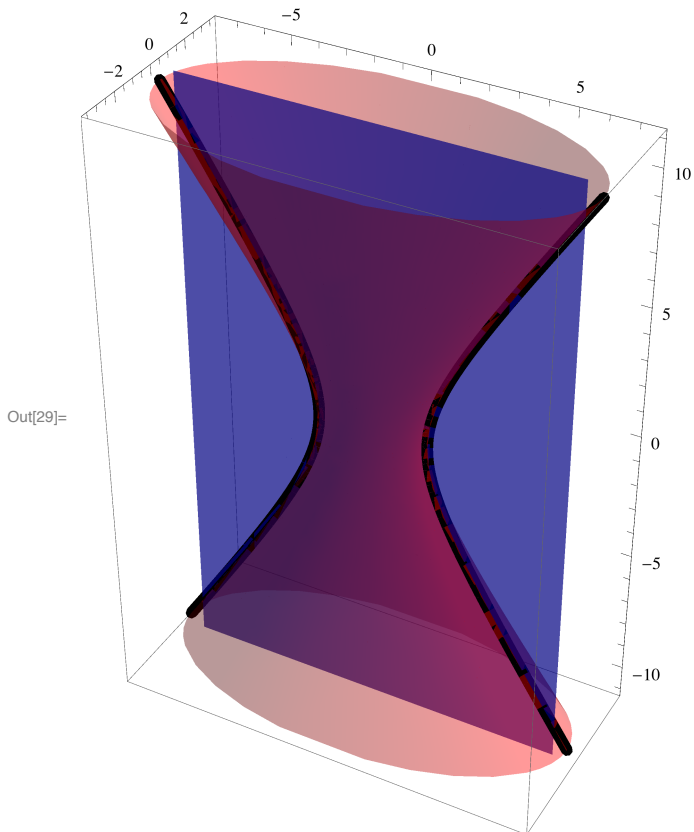
```
In[25]:= (* Caz 3: |h| < b *)
```

$$\text{In[26]:= } h = b - 1; rr = \sqrt{-\frac{h^2}{b^2} + 1};$$

```
In[27]:= PlanVert = ParametricPlot3D[{x, h, z}, {x, -a - 5, a + 5},
  {z, -c - 10, c + 10}, PlotStyle -> {Blue, Opacity[0.7]}, Mesh -> None];
```

```
In[28]:= CurbInt3 = ParametricPlot3D[
  {{rr a Cosh[t], h, rr c Sinh[t]}, {-rr a Cosh[t], h, rr c Sinh[t]}},
  {t, -2, 2}, PlotStyle -> {{Black, Thickness[0.02]}}];
```

```
In[29]:= (* PENTRU CURBA DE INTERSECTIE: *)
Show[QH1, PlanVert, CurbInt3]
```



```
In[30]:= (* Si acum un plan oblic *)
```

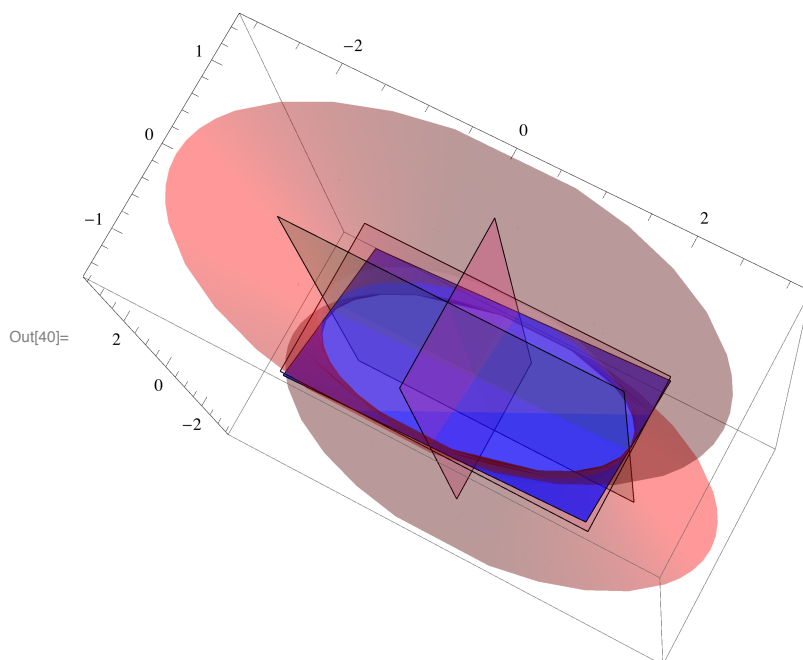
```
In[31]:= aa = -1;
bb = 2;
cc = 5;
dd = 1;
```

```
In[35]:= QH1 = ParametricPlot3D[
  {a Cosh[u] Cos[v], b Cosh[u] Sin[v], c Sinh[u]}, {u, -1, 1}, {v, 0, 2 Pi},
  PlotStyle -> {Red, Opacity[0.4]}, Mesh -> None, AspectRatio -> Automatic];
```

```
In[36]:= PlanOblic = ContourPlot3D[aa x + bb y + cc z + dd == 0, {x, -a, a}, {y, -b, b},
  {z, -c, c}, ContourStyle -> {Blue, Opacity[0.7]}, Mesh -> None];
```

```
In[37]:= xOy = ContourPlot3D[ z == 0, {x, -a, a}, {y, -b, b},
  {z, -c, c}, ContourStyle -> {Pink, Opacity[0.2]}, Mesh -> None];
yOz = ContourPlot3D[ x == 0, {x, -a, a}, {y, -b, b}, {z, -c, c},
  ContourStyle -> {Magenta, Opacity[0.2]}, Mesh -> None];
zOx = ContourPlot3D[ y == 0, {x, -a, a}, {y, -b, b}, {z, -c, c},
  ContourStyle -> {Green, Opacity[0.2]}, Mesh -> None];
```

```
In[40]:= Show[QH1, xOy, yOz, zOx, PlanOblic]
```



```
In[41]:= (* planul tangent intr-un punct prin dedublare *)
```

```
In[42]:= a = 2;
b = 1;
c = 3;
x0 = 2;
y0 = 1;
z0 = 3;
```

```
In[48]:= aa =  $\frac{x0}{a^2}$ ; bb =  $\frac{y0}{b^2}$ ; cc =  $\frac{z0}{c^2}$ ; dd = -1;
```

```
In[49]:= QH1 = ParametricPlot3D[{a Cosh[u] Cos[v], b Cosh[u] Sin[v], c Sinh[u]},
  {u, -1.5, 1.5}, {v, 0, 2 Pi}, PlotStyle -> {Pink, Opacity[0.2]},
  Mesh -> None, AspectRatio -> Automatic];
```

```
In[50]:= PlanTang = ContourPlot3D[aa x + bb y - cc z + dd == 0, {x, -a - 1, a + 1}, {y, -b - 1, b + 1},
  {z, -c - 2, c + 2}, ContourStyle -> {Blue, Opacity[0.7]}, Mesh -> None];
```

```
In[51]:= pct = Graphics3D[Sphere[{x0, y0, z0}, 0.1]];
```

```
In[52]:= Show[QH1, PlanTang, pct]
```

```
Out[52]=
```

