

Schläuche

Rechnung

```

Remove["Global`*"];

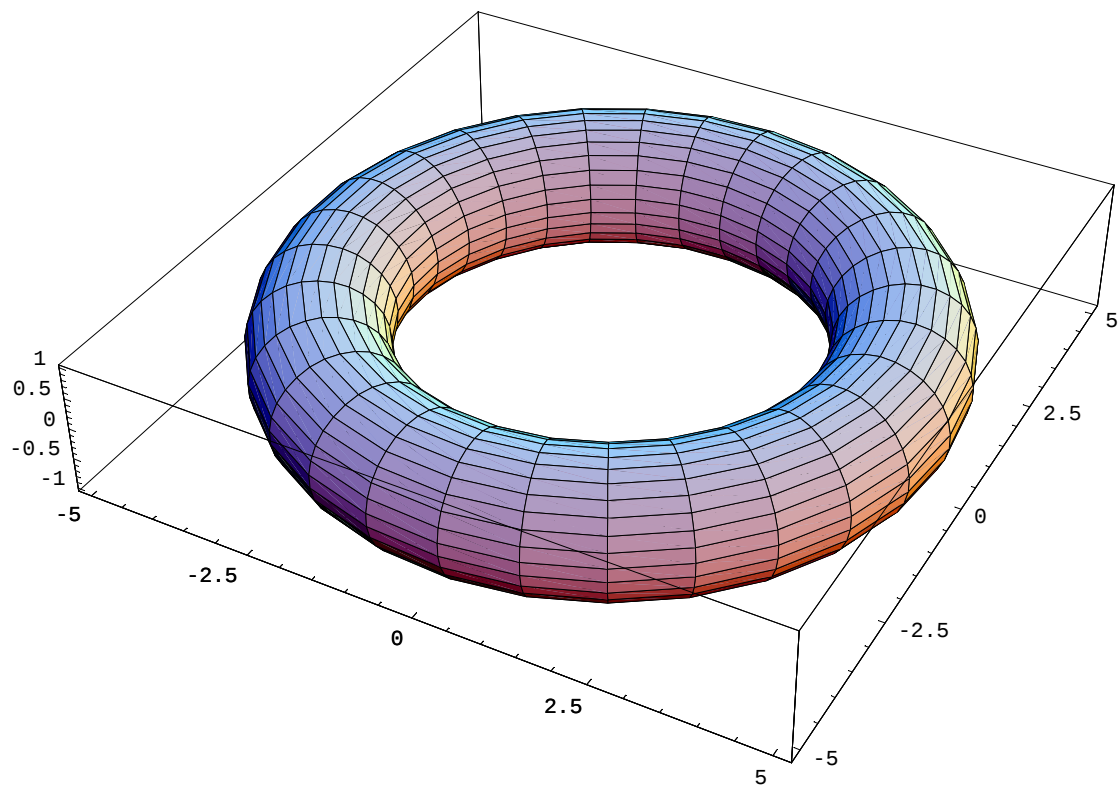
In[5]:= from[uhu_] := Module[{},
  (*Rechnung*)
  v[t_] := {x[t], y[t], z[t]};
  κ[t_] := Sqrt[
    ((v'[t].v'[t]) (v'[t].v'[t]) - (v'[t].v'[t])^2) / ((v'[t]).(v'[t]))^3];
  tT[t_] := v'[t] / Sqrt[v'[t].v'[t]];
  nN[t_] := 1 / κ[t] 1 / Sqrt[v'[t].v'[t]] D[v'[t] / Sqrt[v'[t].v'[t]], t];
  bB[t_] := Cross[tT[t], nN[t]];
  w[t_, φ_] := v[t] + a[t, φ] Cos[φ] nN[t] + b[t, φ] Sin[φ] bB[t];
  (*Plot*)
  ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 2 Pi}, {φ, 0, 2 Pi}];

```

Demos Schlauchdefinitionen

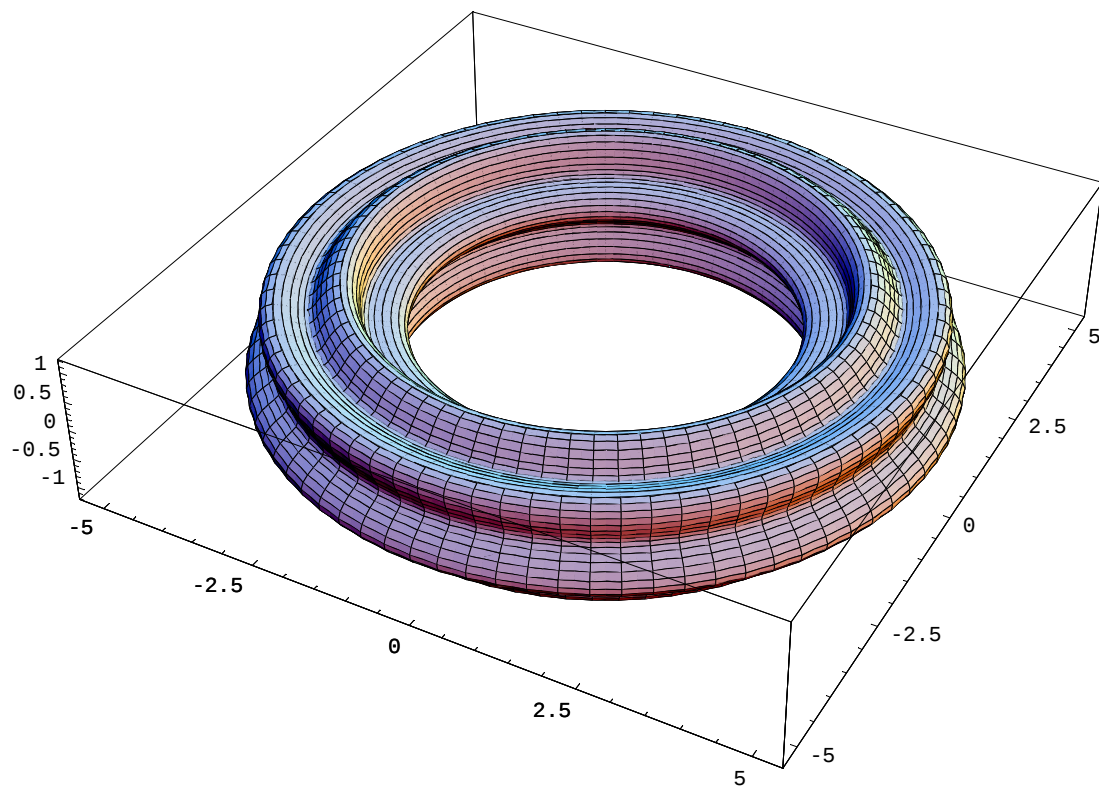
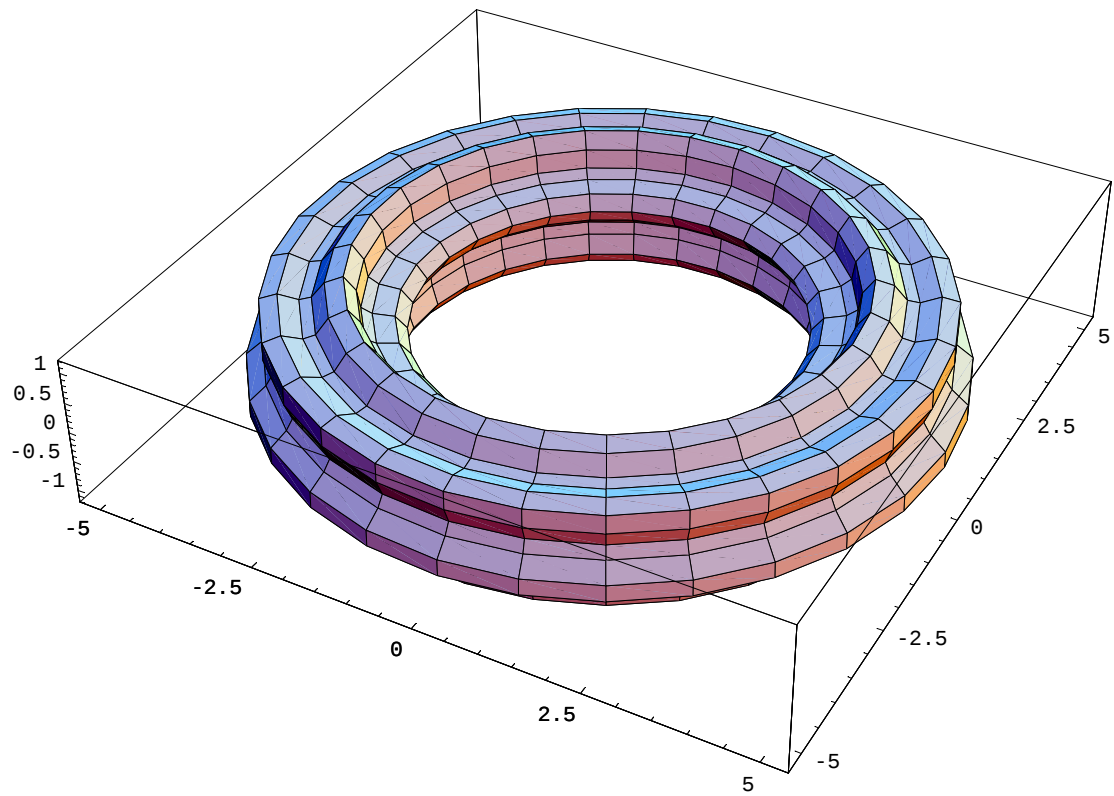
1

```
In[7]:= (*Schlauchdefinitionen*)
x[t_] = 4 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := 0;
a[t_, φ_] := 1; b[t_, φ_] := 1;
from[uhu];
```



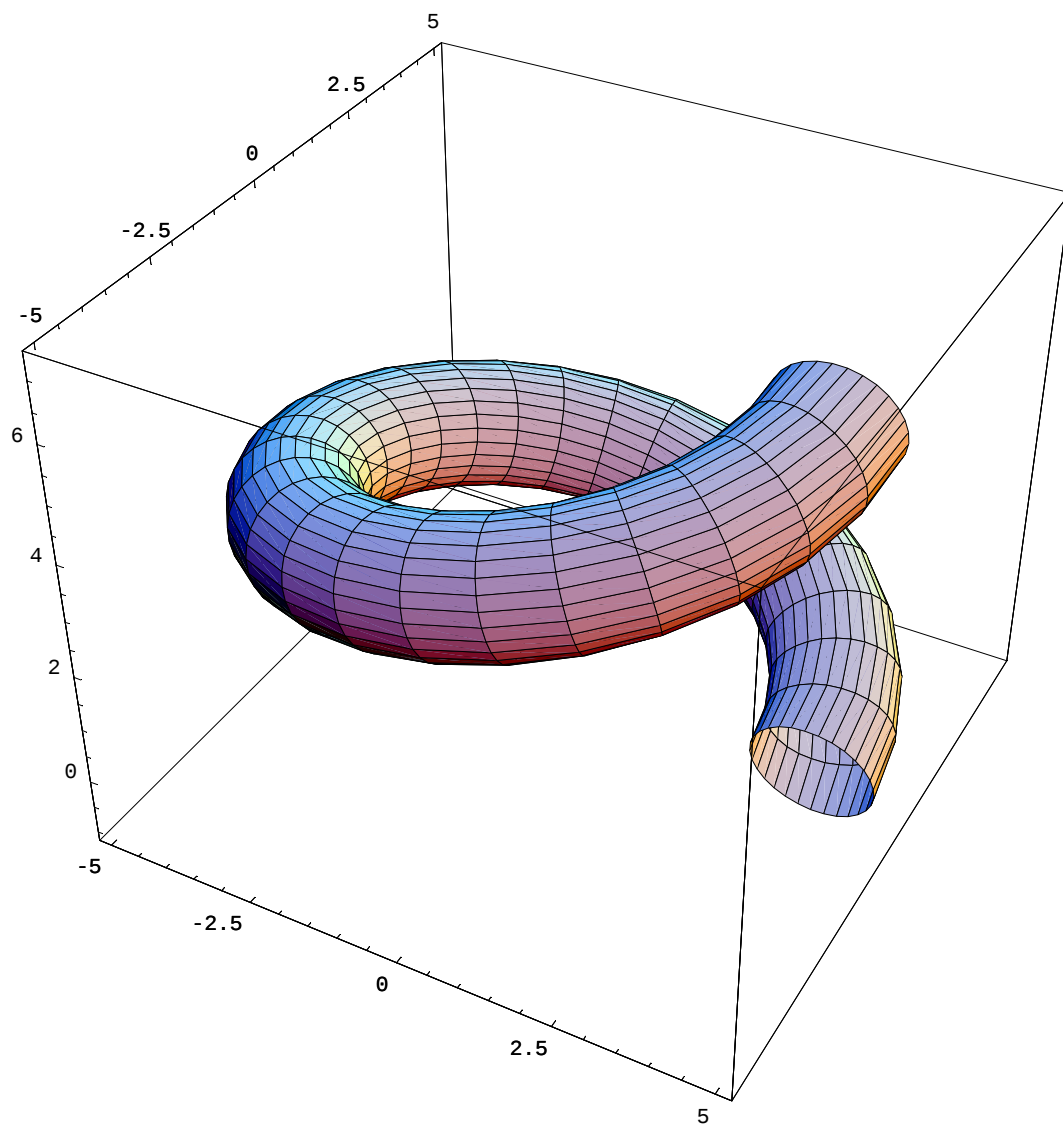
2

```
In[13]:= (*Schlauchdefinitionen*)
x[t_] = 4 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := 0;
a[t_, φ_] := 1 + Sin[6 φ] / 5; b[t_, φ_] := 1 + Sin[6 φ] / 5;
from[uhu];
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 4 Pi}, {φ, 0, 2 Pi}, PlotPoints → 80];
```

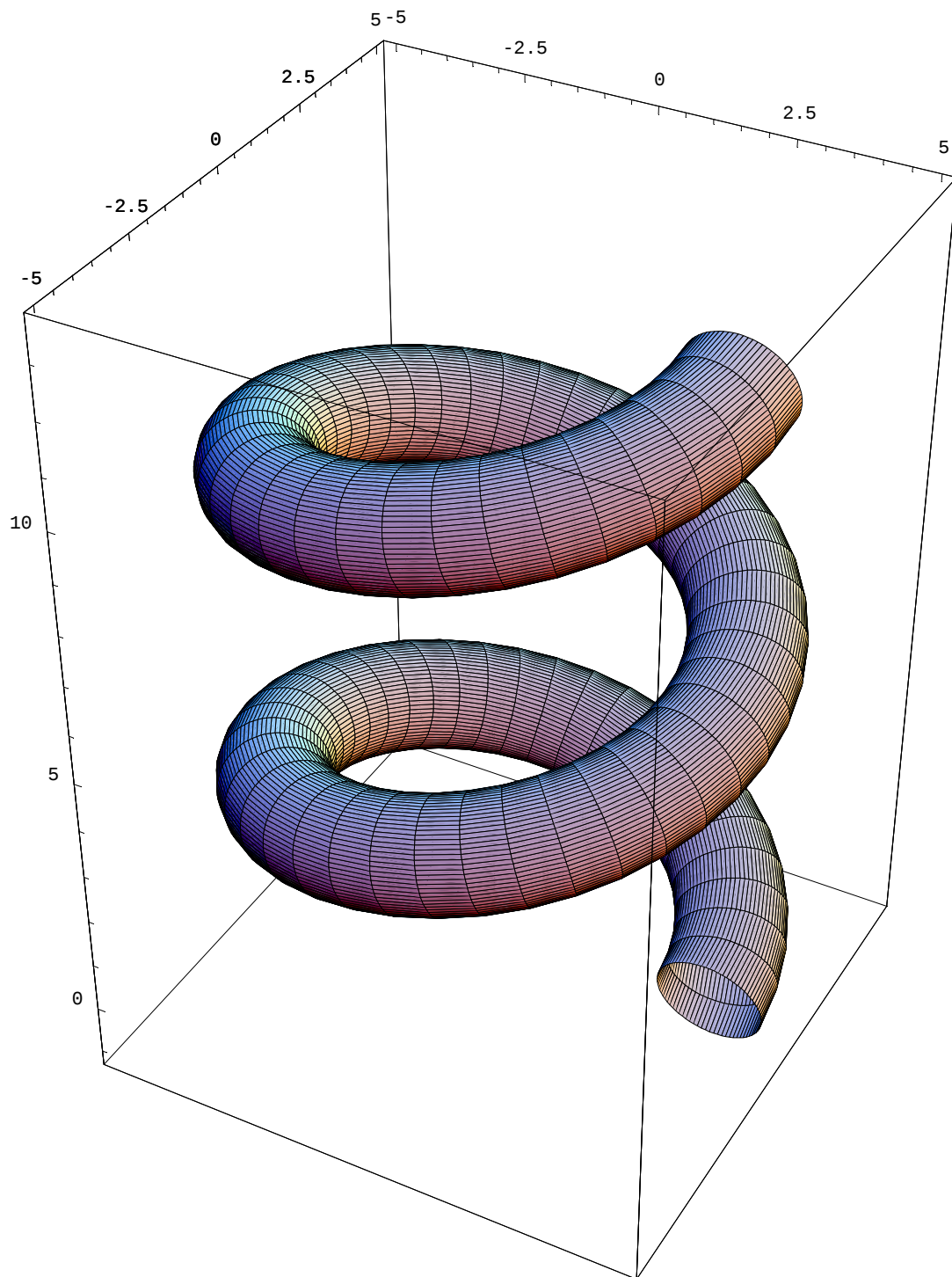


2

```
In[17]:= (*Schlauchdefinitionen*)  
x[t_] = 4 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := t;  
a[t_, φ_] := 1; b[t_, φ_] := 1;  
from[uhu];
```

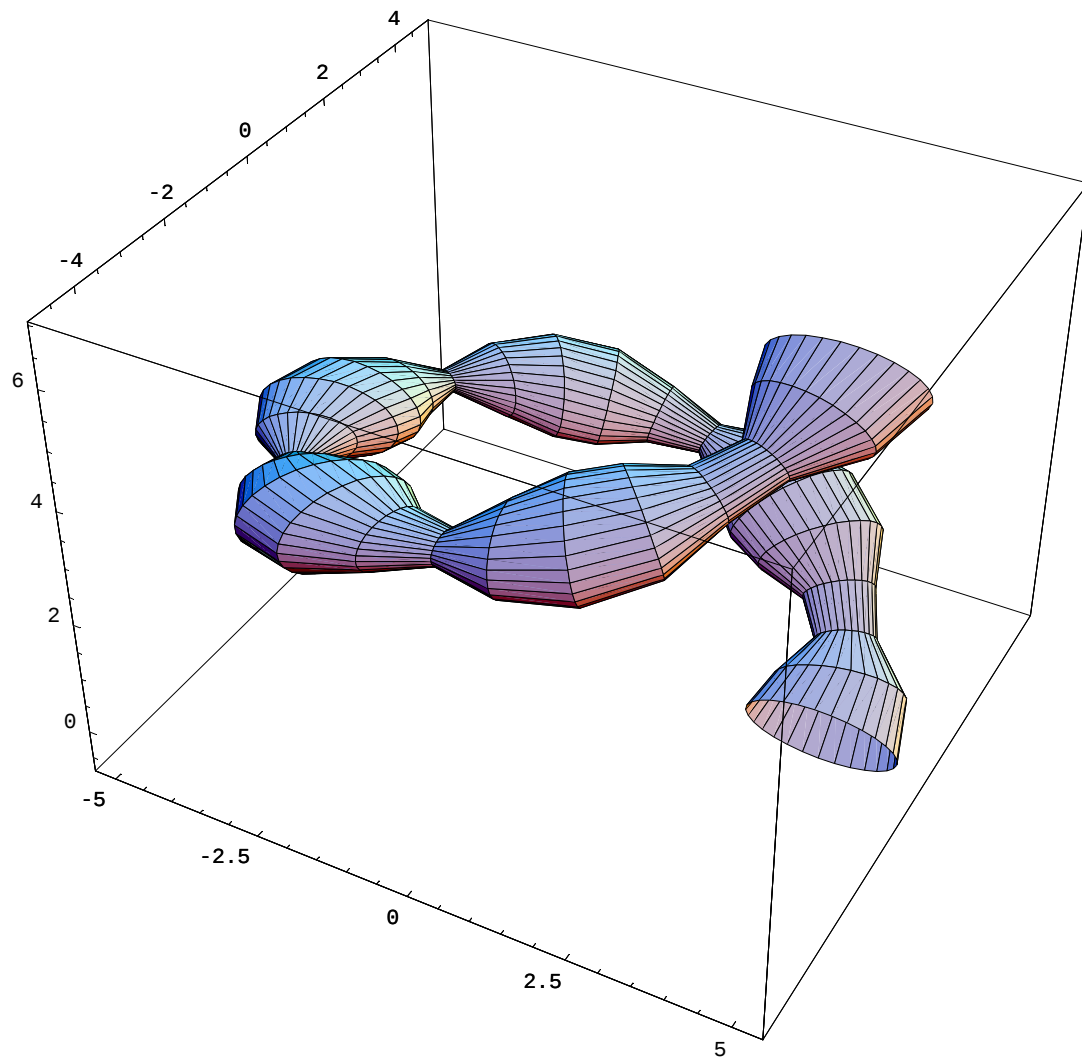


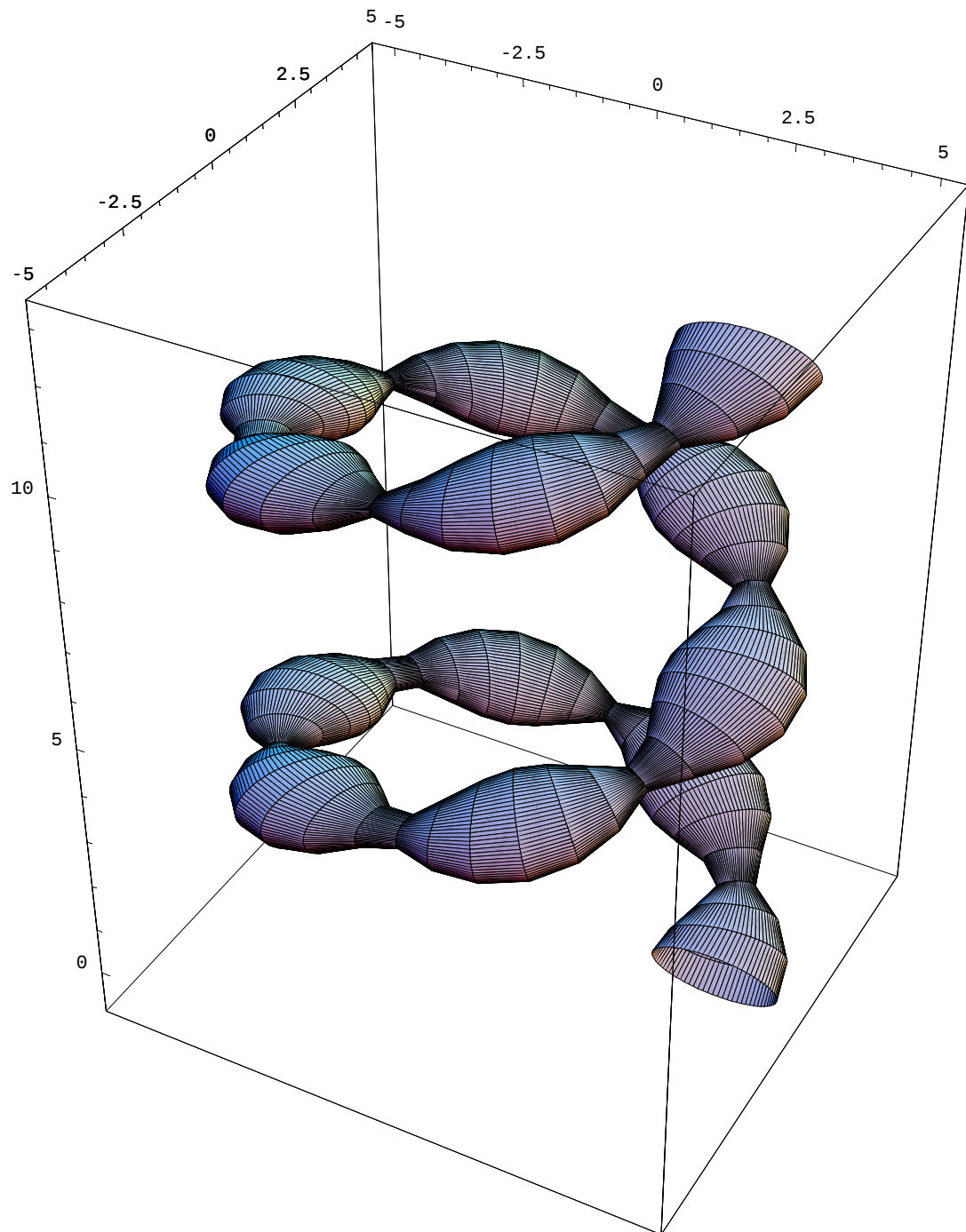
```
In[20]:= ParametricPlot3D[Evaluate[w[t,φ]],{t,0,4Pi},{φ,0,2Pi},PlotPoints→80];
```



2

```
In[83]:= (*Schlauchdefinitionen*) x[t_] = 4 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := t;
a[t_, φ_] := (Abs[Cos[3 t]] + 0.2); b[t_, φ_] := (Abs[Cos[3 t]] + 0.2) / 2;
from[uhu];
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 4 Pi}, {φ, 0, 2 Pi}, PlotPoints → 80];
```

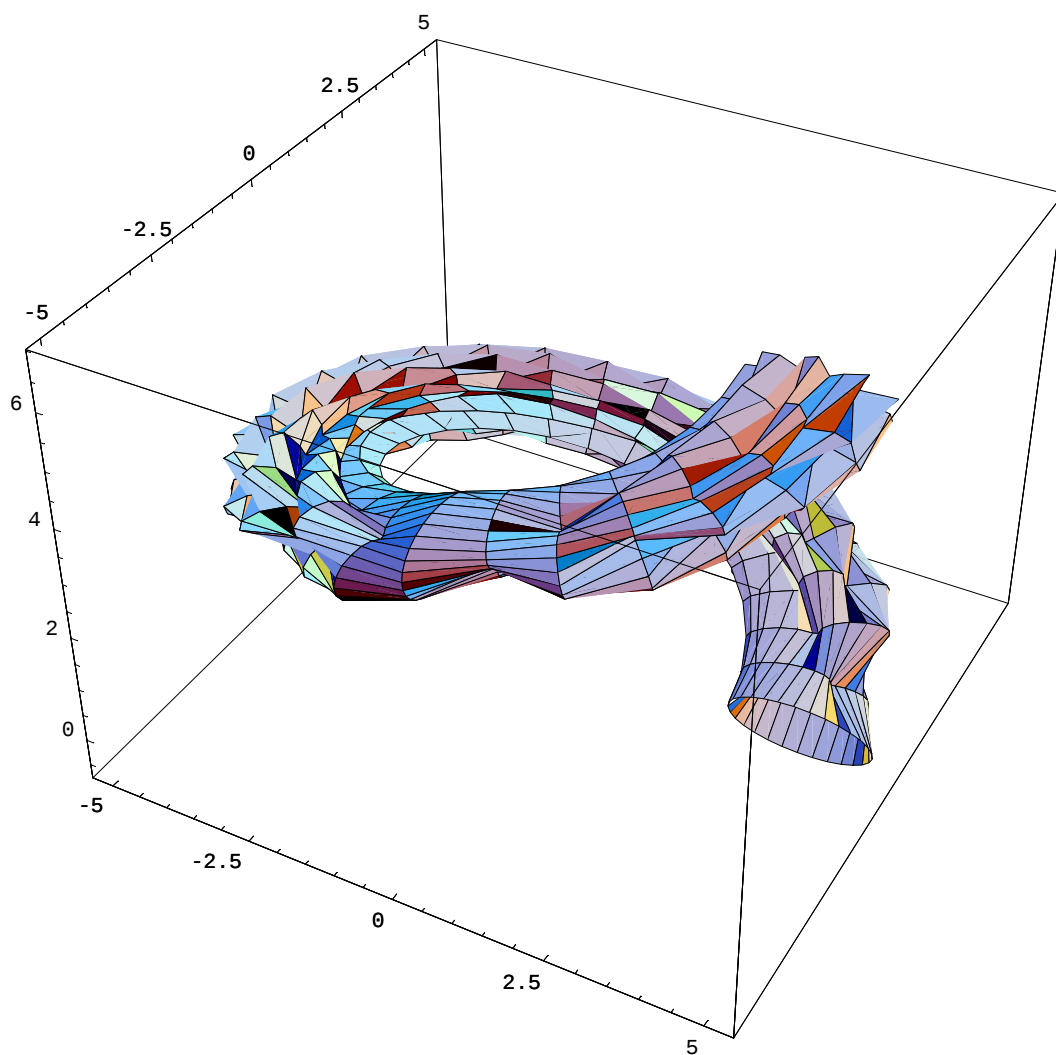


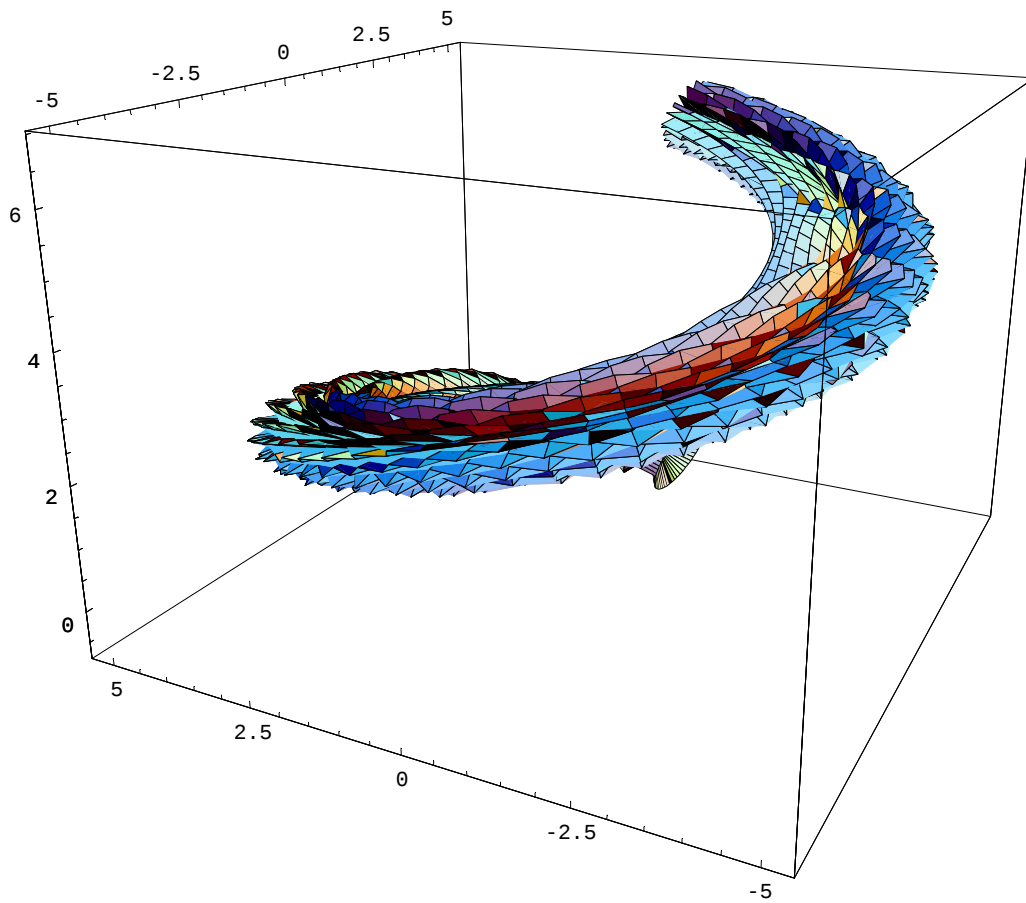


Ergebnisse von Untersuchungen der Klasse M2p: Schlauchdefinitionen für interessante Formen

1

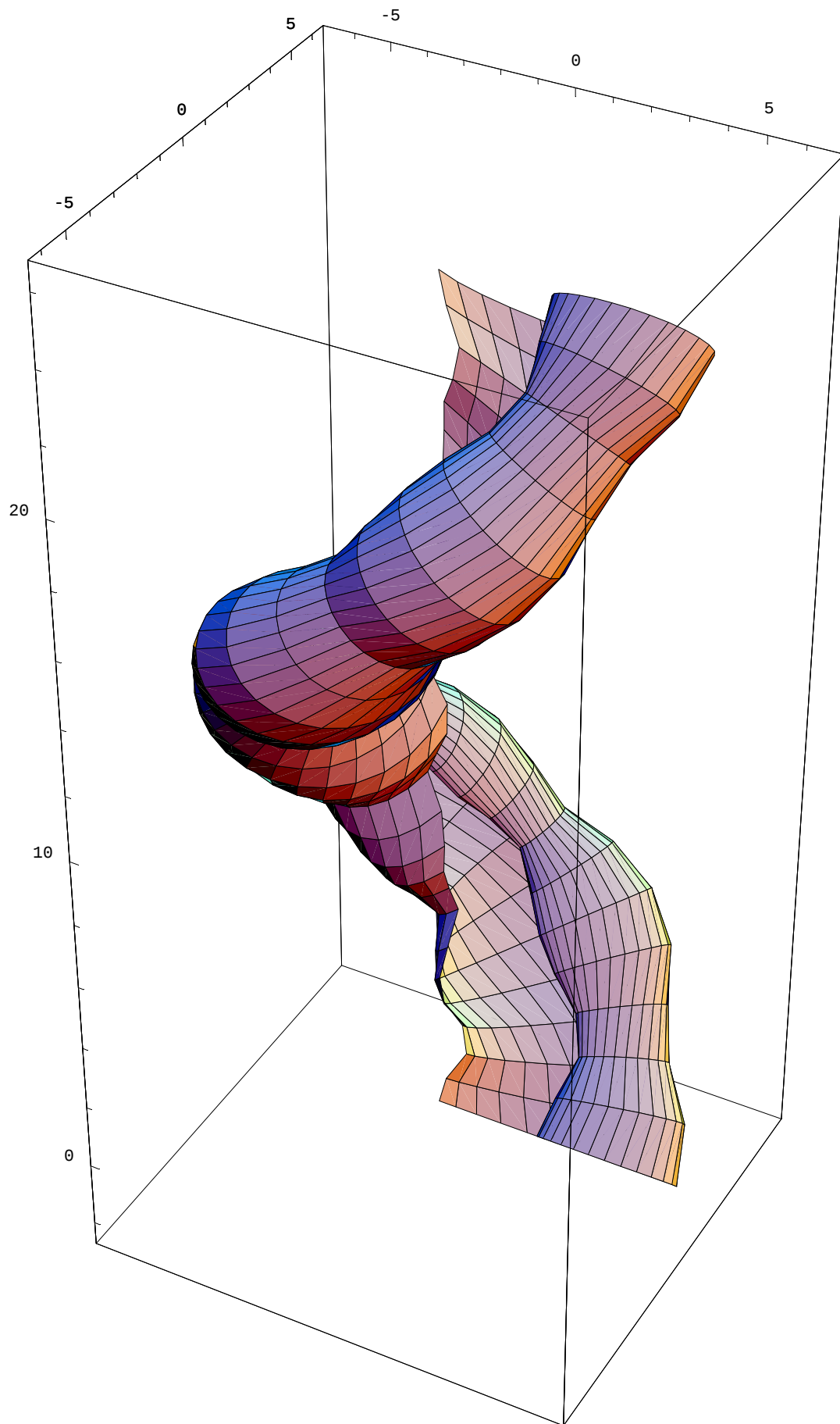
```
In[28]:= (*Schlauchdefinitionen*)
x[t_] = 4 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := t;
a[t_, φ_] := (Abs[Cos[3 t φ]] + 0.2); b[t_, φ_] := (Abs[Cos[3 t φ]] + 0.2) / 2;
from[uhu];
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 2 Pi},
  {φ, 0, 2 Pi}, ViewPoint → {-1.735, -0.867, 0.664}, PlotPoints → 60];
```

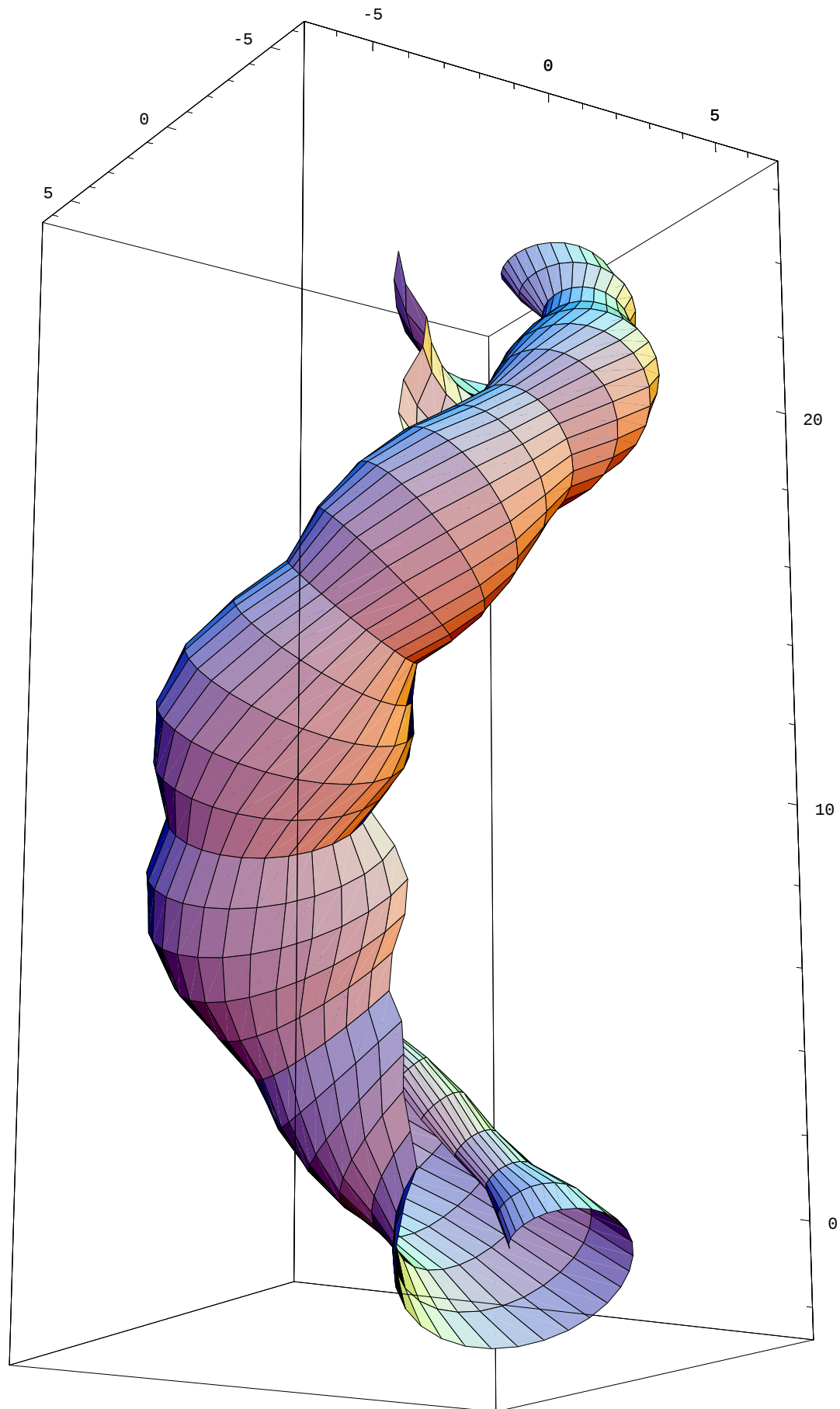




2

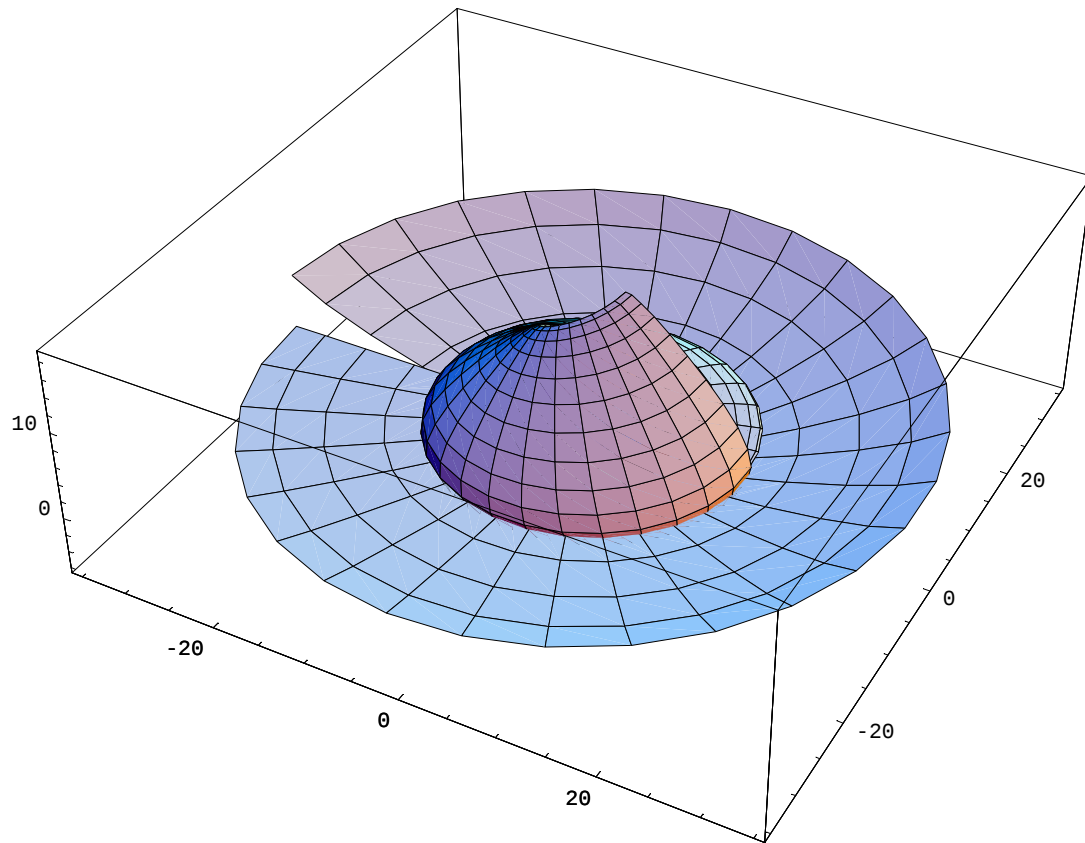
```
In[32]:= x[t_] = 4 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := 4 t;
a[t_, φ_] := (Abs[Cos[3 t]] + 0.5 φ); b[t_, φ_] := (Abs[Cos[3 t]] + φ) / 2;
from[uhu];
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 2 Pi},
  {φ, 0, 2 Pi}, ViewPoint -> {-1.730, -2.722, -1.025}];
```

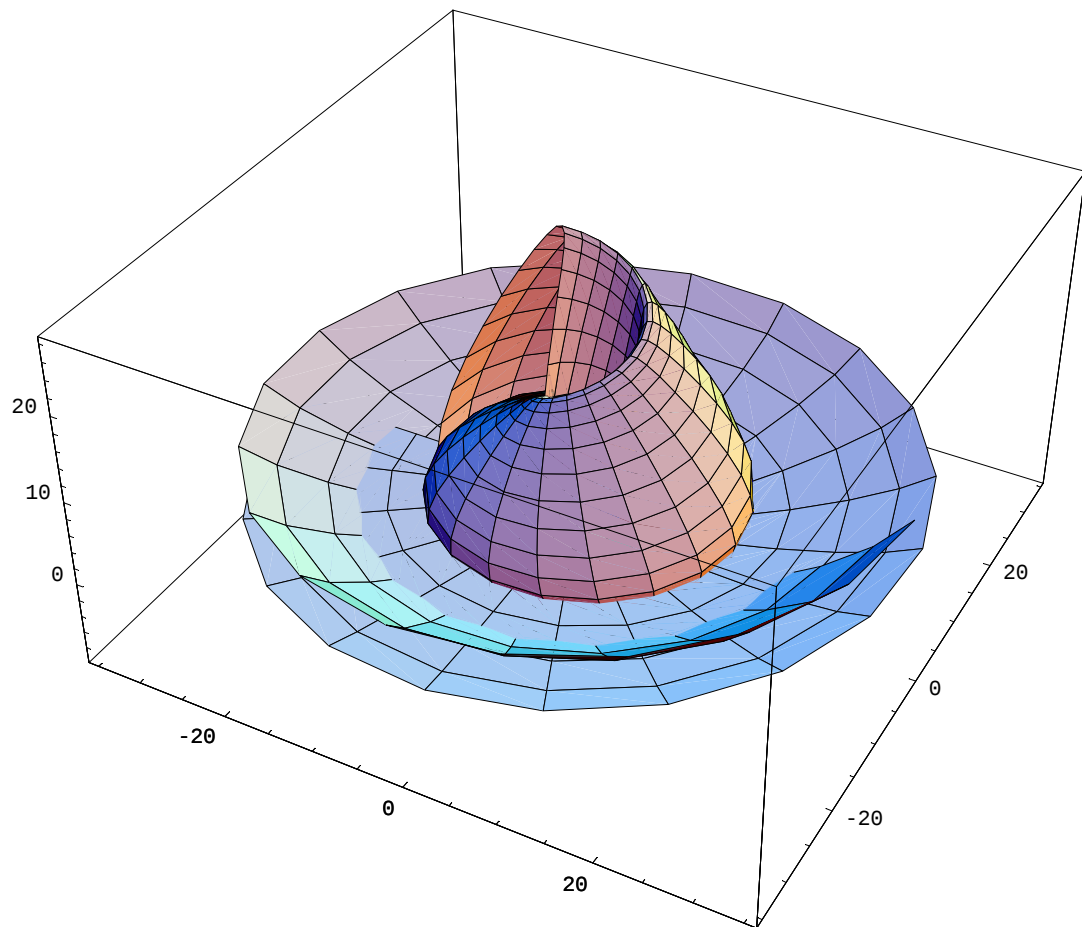




3

```
In[36]:= x[t_] = 5 Cos[t]; y[t_] := 5 Sin[t]; z[t_] := t;  
a[t_, φ_] := φ^2; b[t_, φ_] := 2 t;  
from[uhu];  
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 3 Pi}, {φ, 0, 2 Pi}];
```



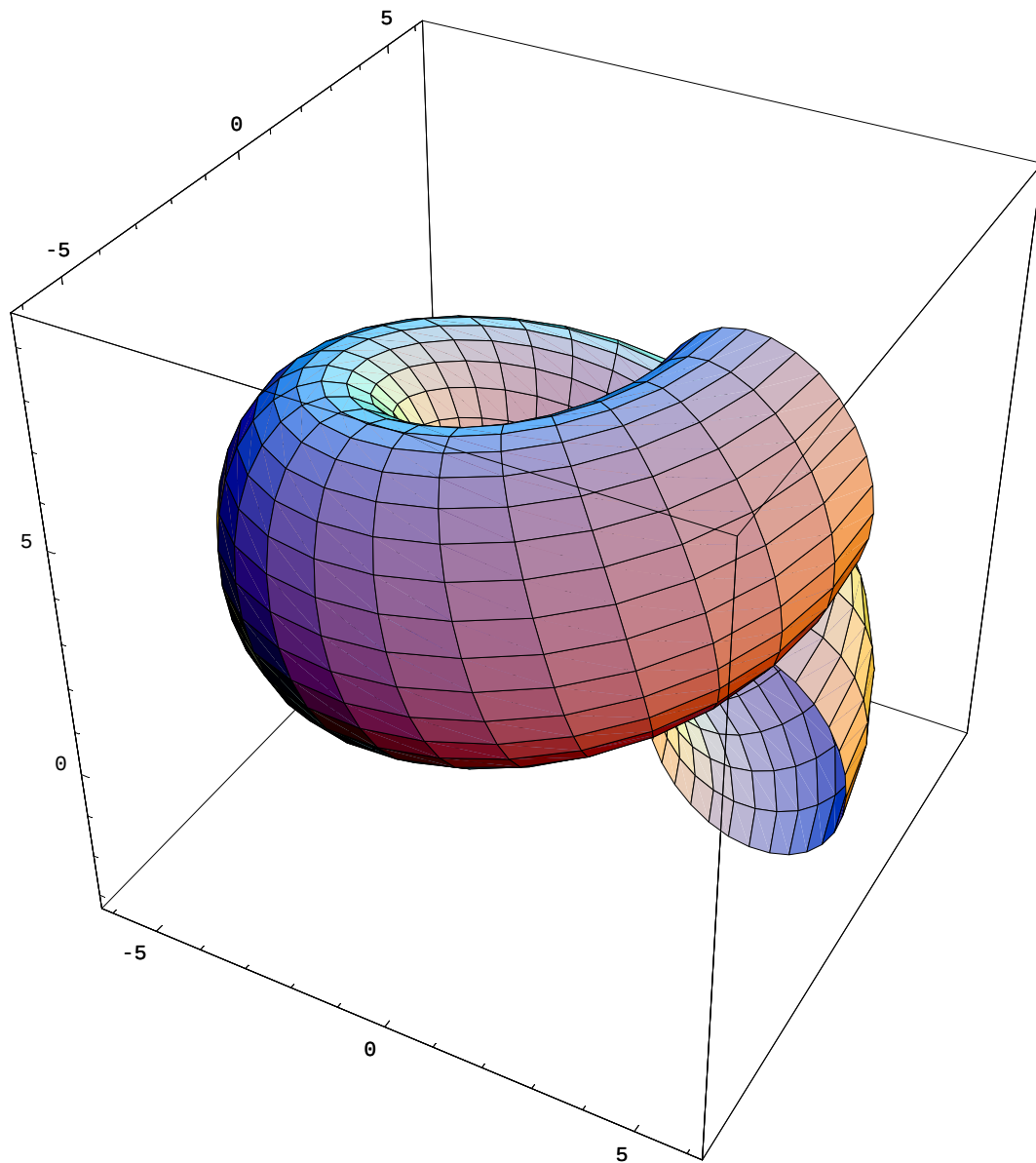


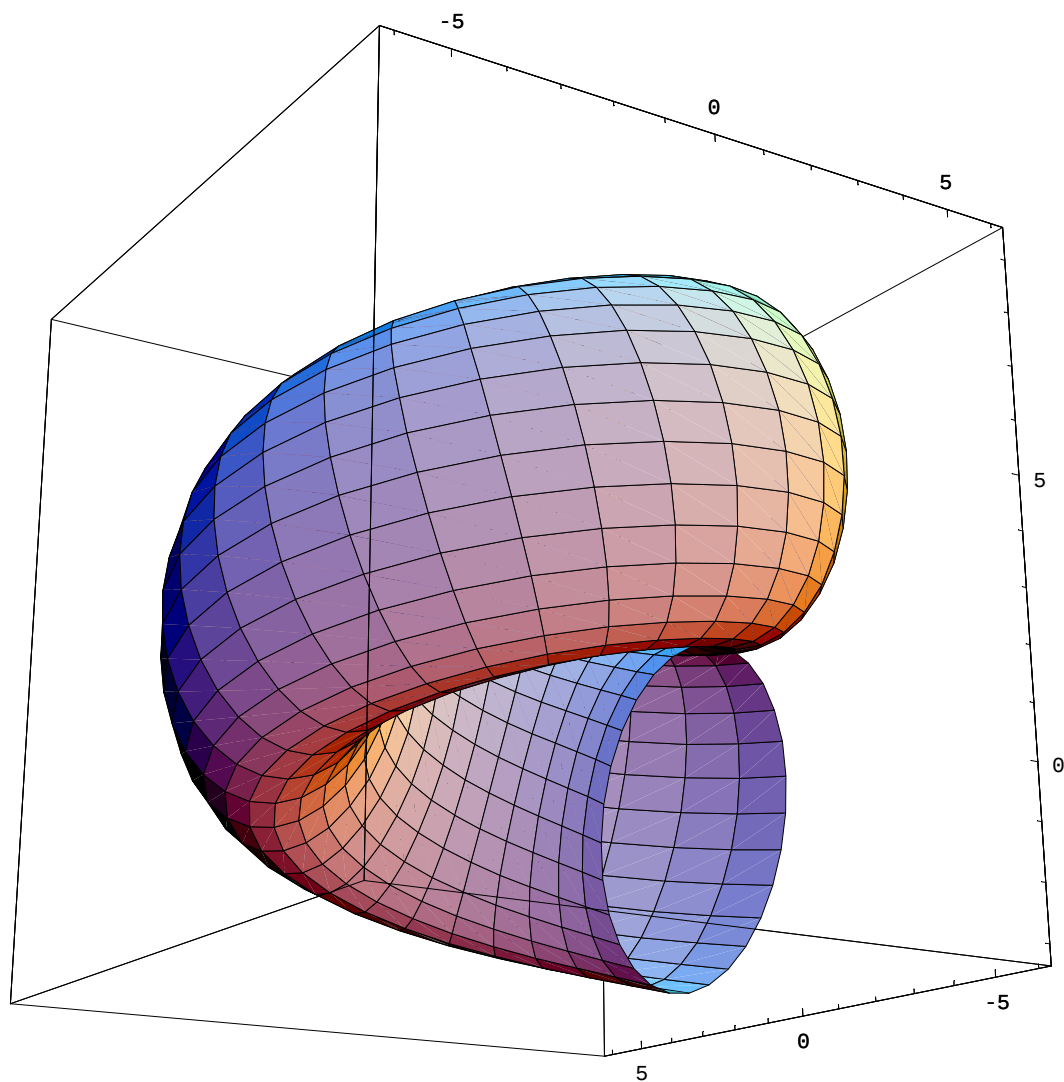
4

```

In[40]:= x[t_] = 4 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := t;
a[t_, φ_] := 2; b[t_, φ_] := Pi;
from[uhu];
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 2 Pi},
  {φ, 0, 2 Pi}, ViewPoint -> {-1.730, -2.722, -1.025}];

```



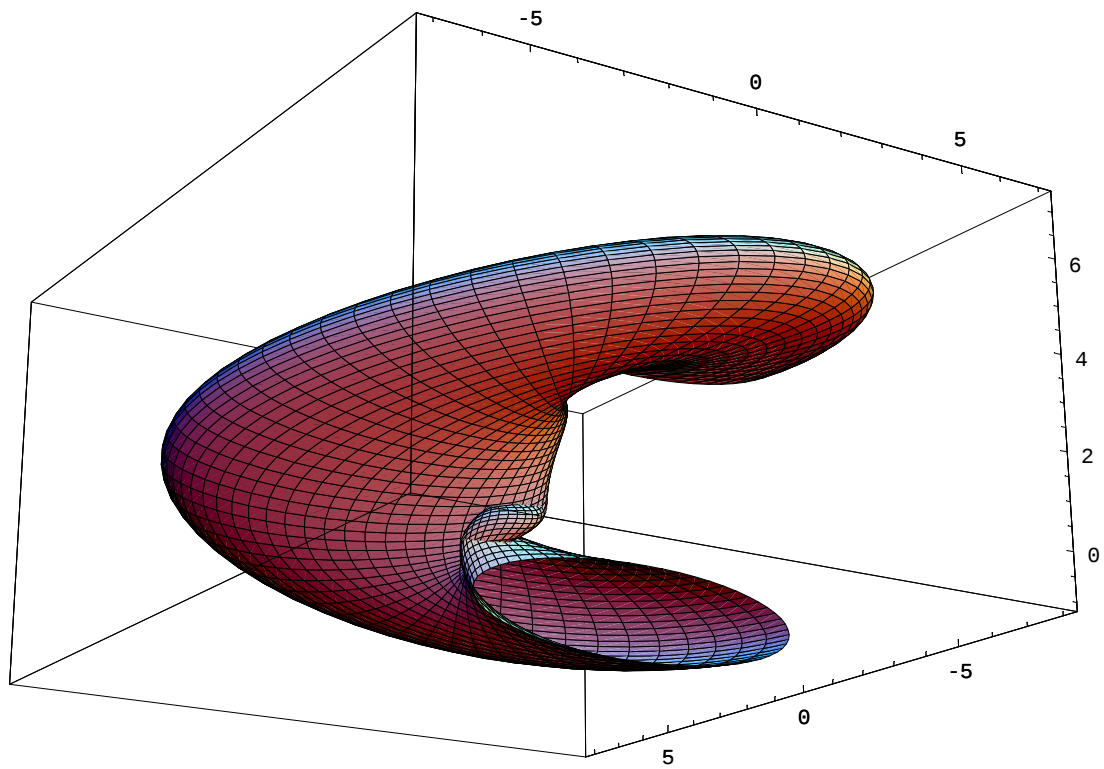
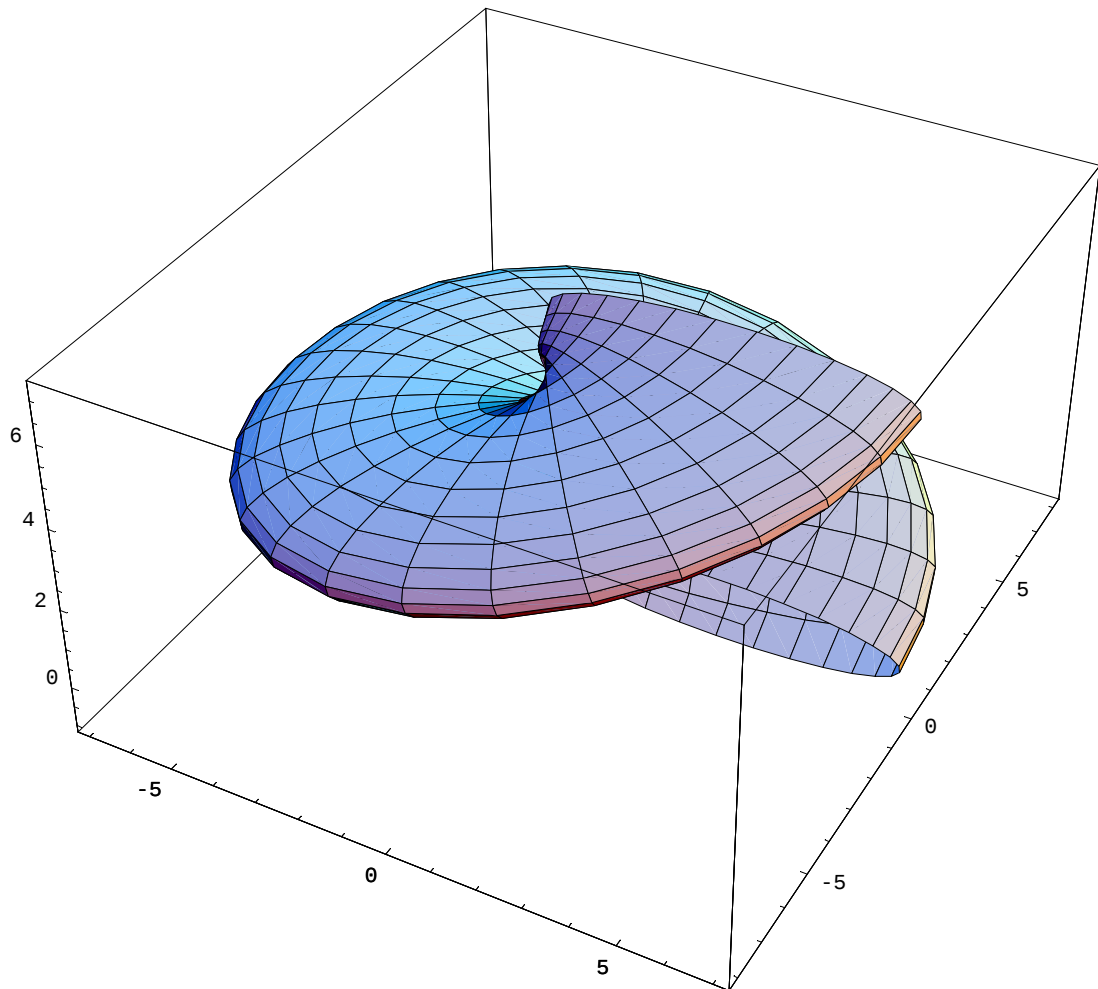


5

```

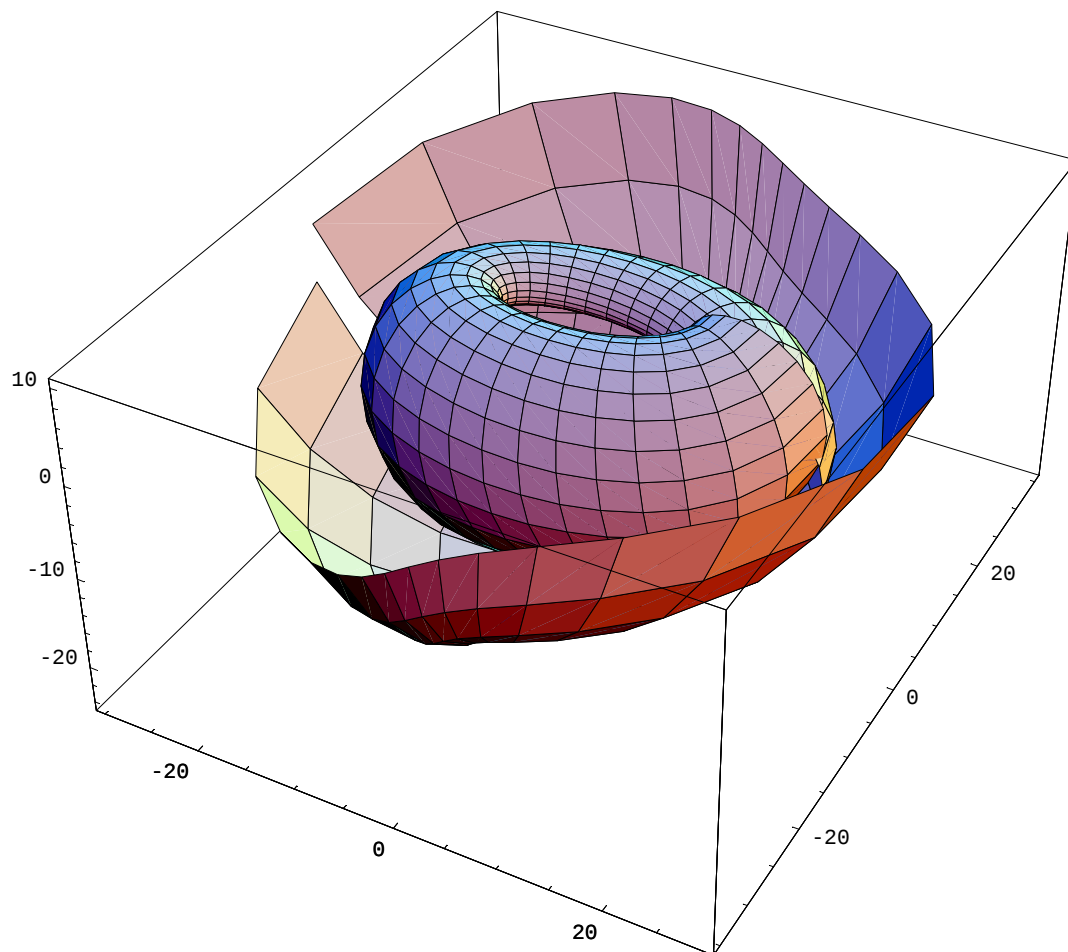
In[79]:= x[t_] = 3 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := t;
a[t_, φ_] := 4; b[t_, φ_] := 1;
from[uhu];
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 2 Pi},
  {φ, 0, 2 Pi}, ViewPoint -> {-1.730, -2.722, -1.025}, PlotPoints -> 60];

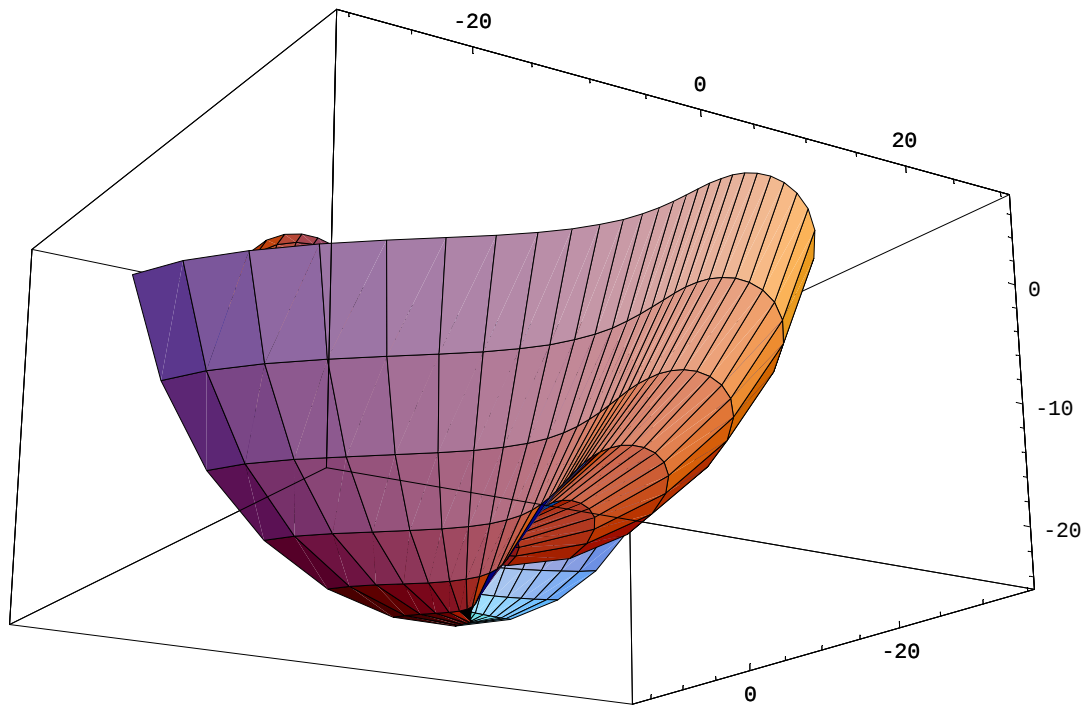
```



6

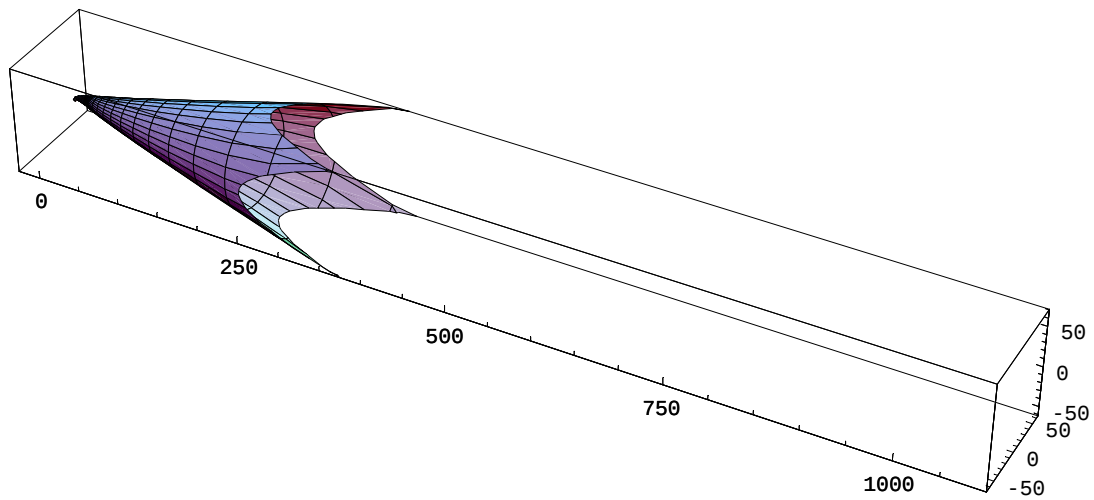
```
In[48]:= x[t_] = 10 Cos[t]; y[t_] := 5 Sin[t]; z[t_] := t;  
a[t_,  $\varphi$ _] :=  $\varphi^2$ ; b[t_,  $\varphi$ _] :=  $\varphi^2$ ;  
from[uhu];  
ParametricPlot3D[Evaluate[w[t,  $\varphi$ ]], {t, 0, Pi},  
{ $\varphi$ , 0, 2 Pi}, ViewPoint -> {-1.730, -2.722, -1.025}];
```

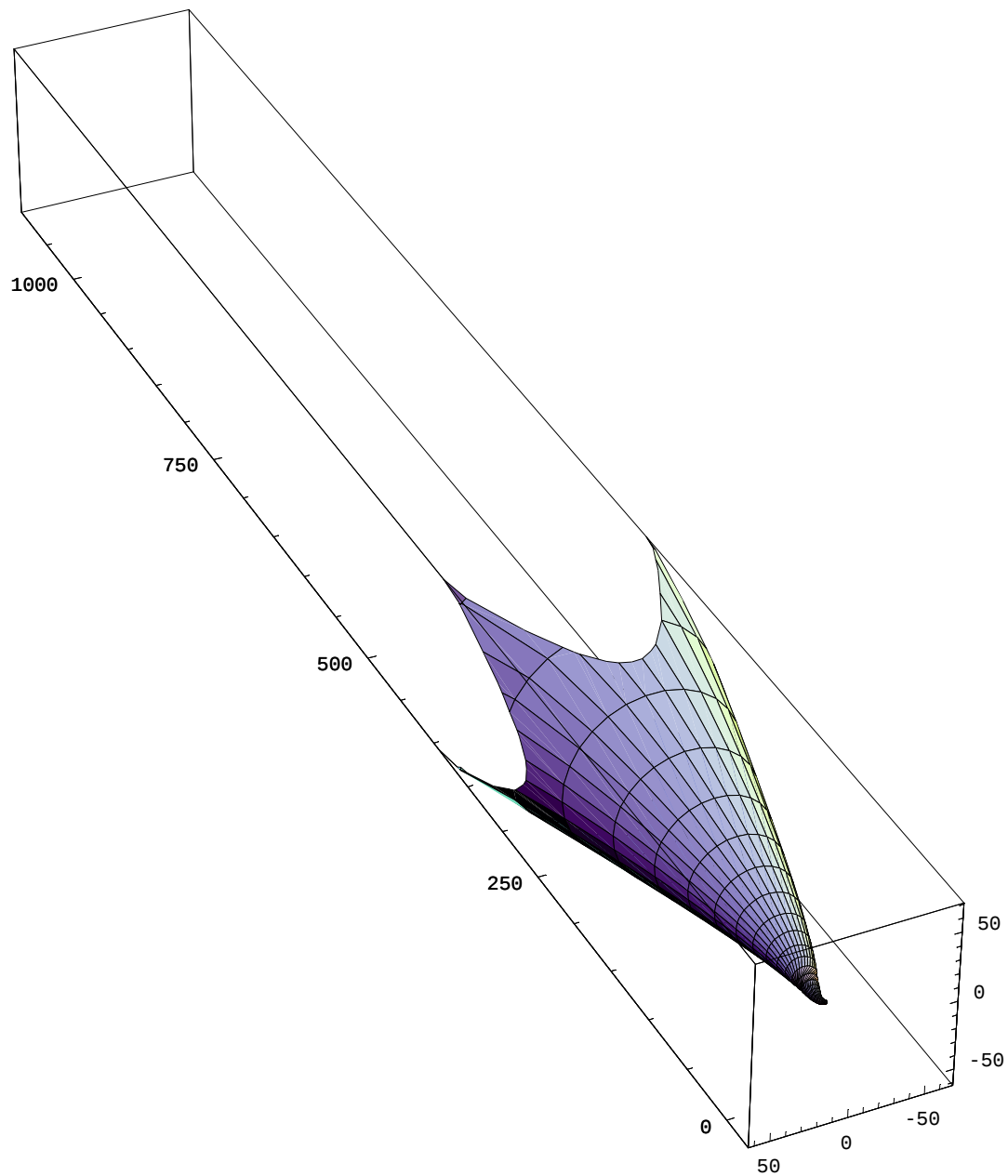




7 Bleistiftspitze

```
In[52]:= x[t_] = 4 Cosh[t]; y[t_] := 4 Sin[t]; z[t_] := t;
a[t_, φ_] := Sinh[t] + 1; b[t_, φ_] := Sinh[t] + 1;
from[uhu];
ParametricPlot3D[Evaluate[w[t, φ]],
  {t, 0, 2 Pi}, {φ, 0, 2 Pi}, ViewPoint → {-2.540, 1.173, 1.904}];
```



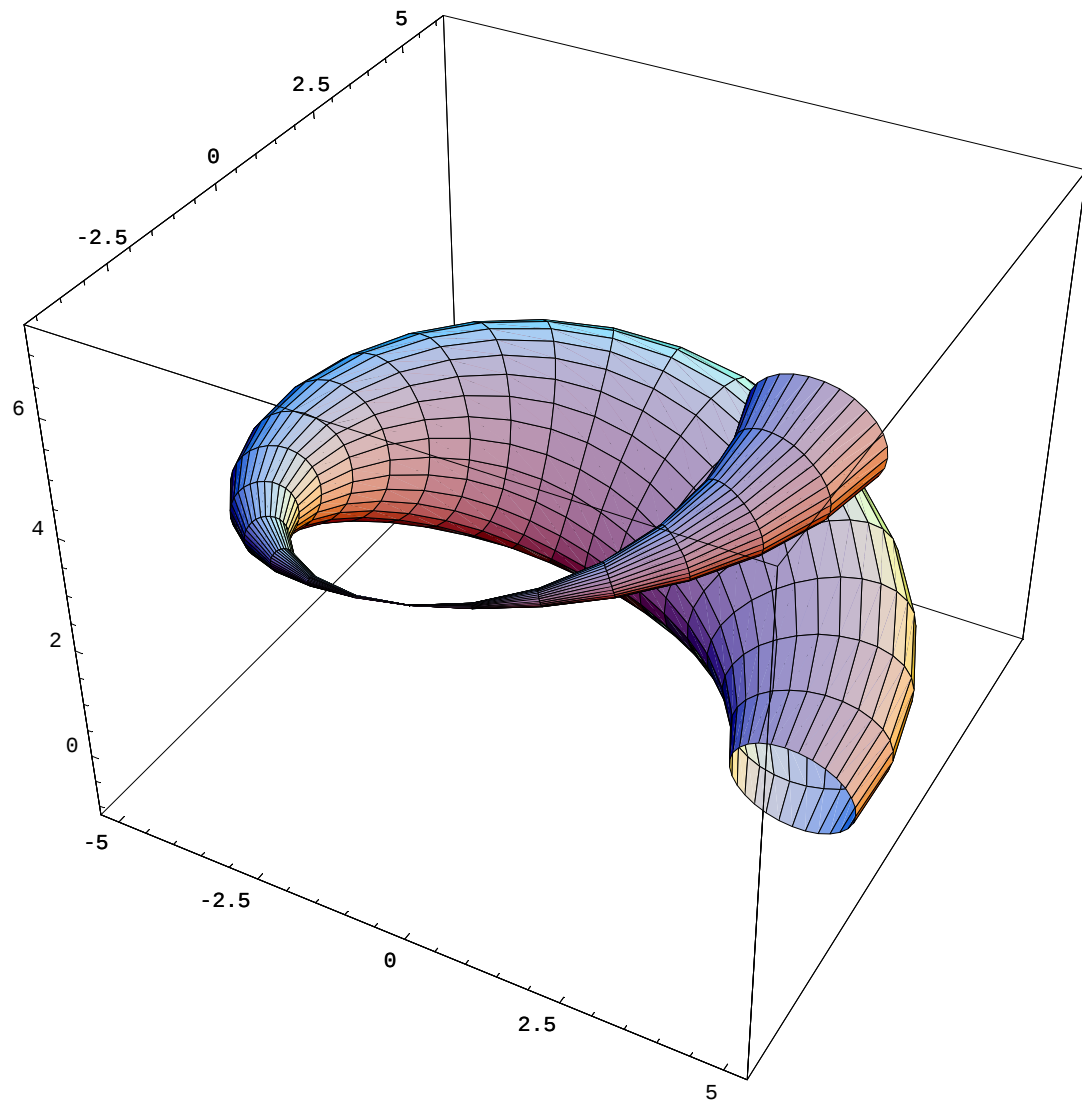


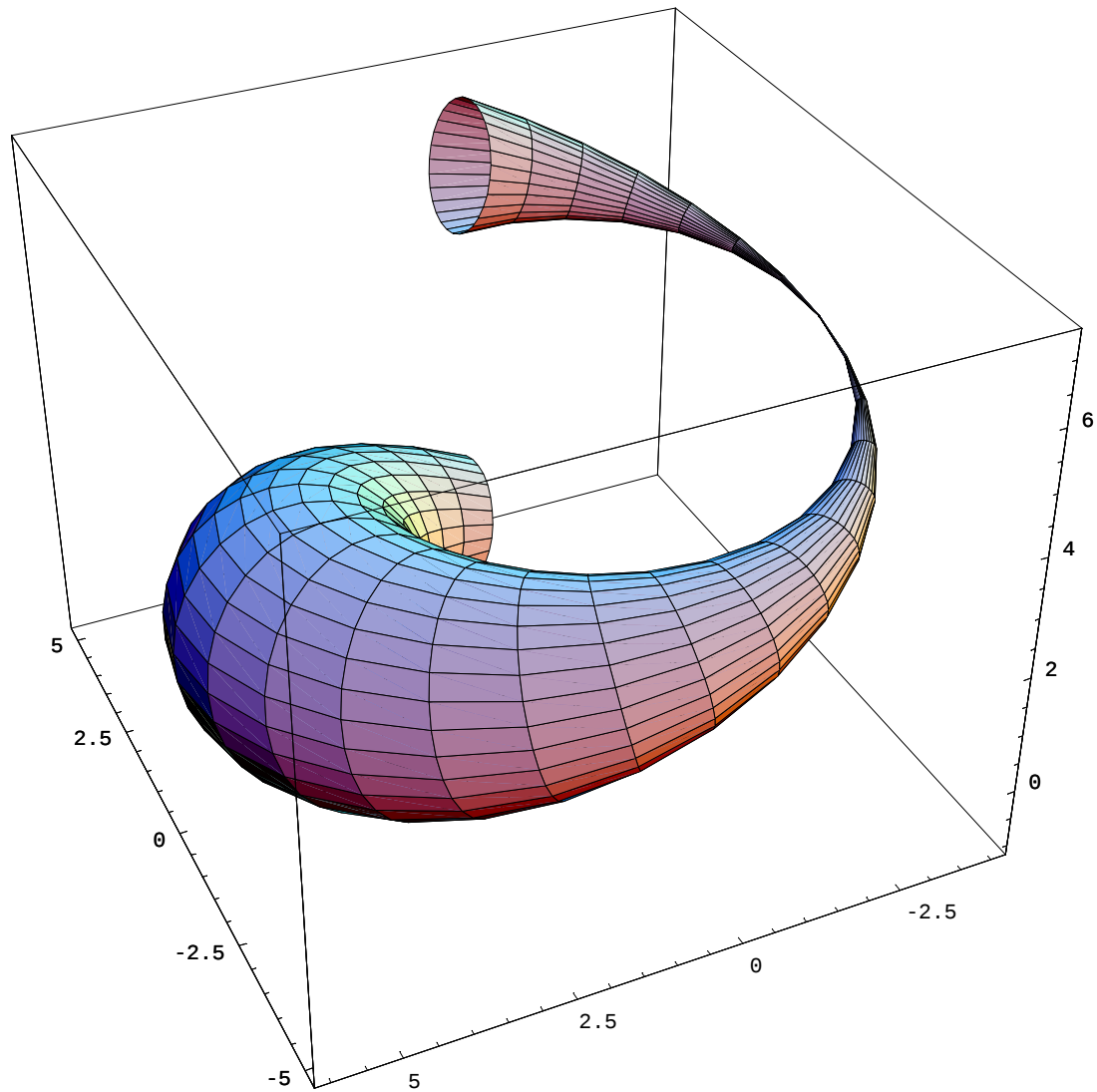
8 Wirrwar

```

In[56]:= x[t_] = 4 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := t;
a[t_, φ_] := Sin[t] + 1; b[t_, φ_] := Sin[t] + 1;
from[uhu];
ParametricPlot3D[Evaluate[w[t, φ]],
  {t, 0, 2 Pi}, {φ, 0, 2 Pi}, ViewPoint → {-2.540, 1.173, 1.904}];

```



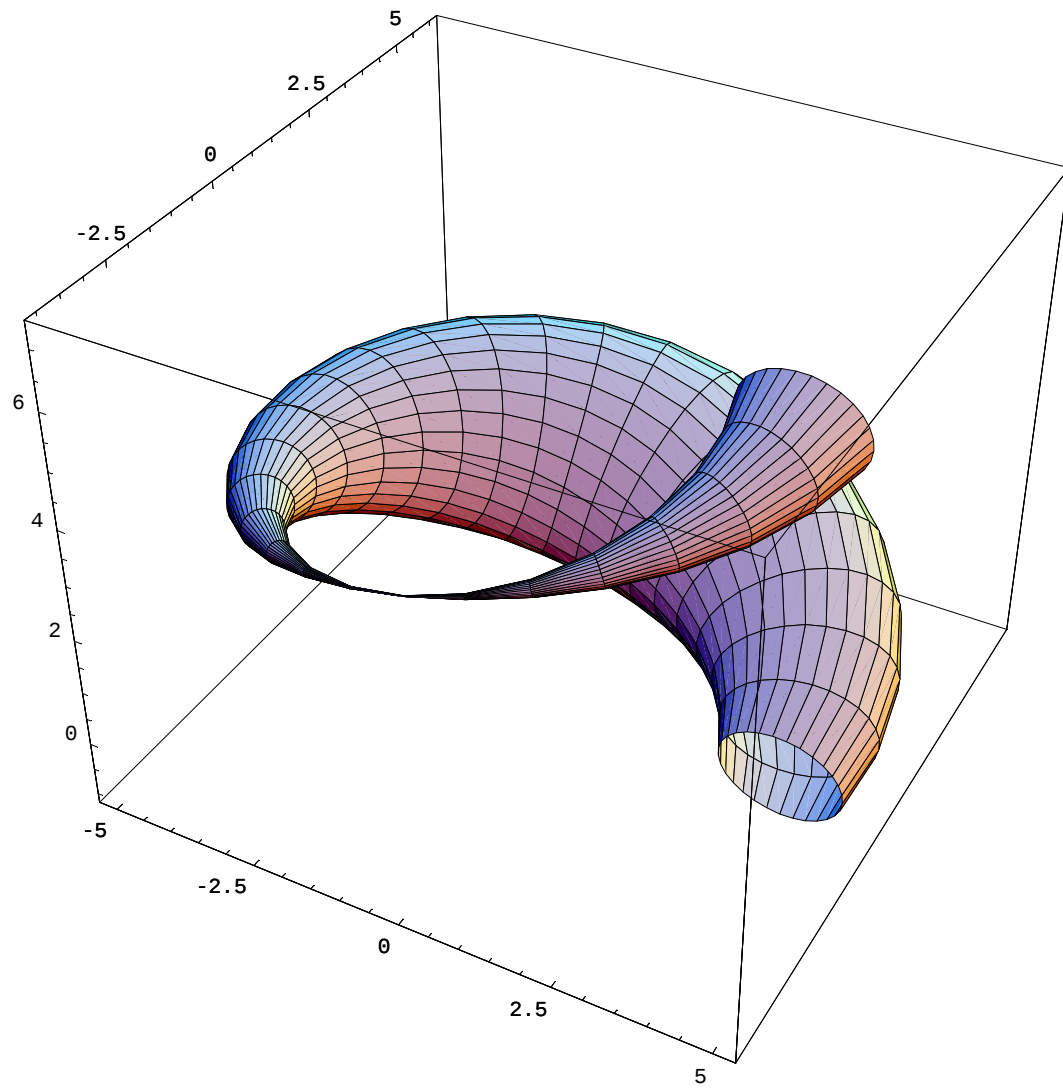


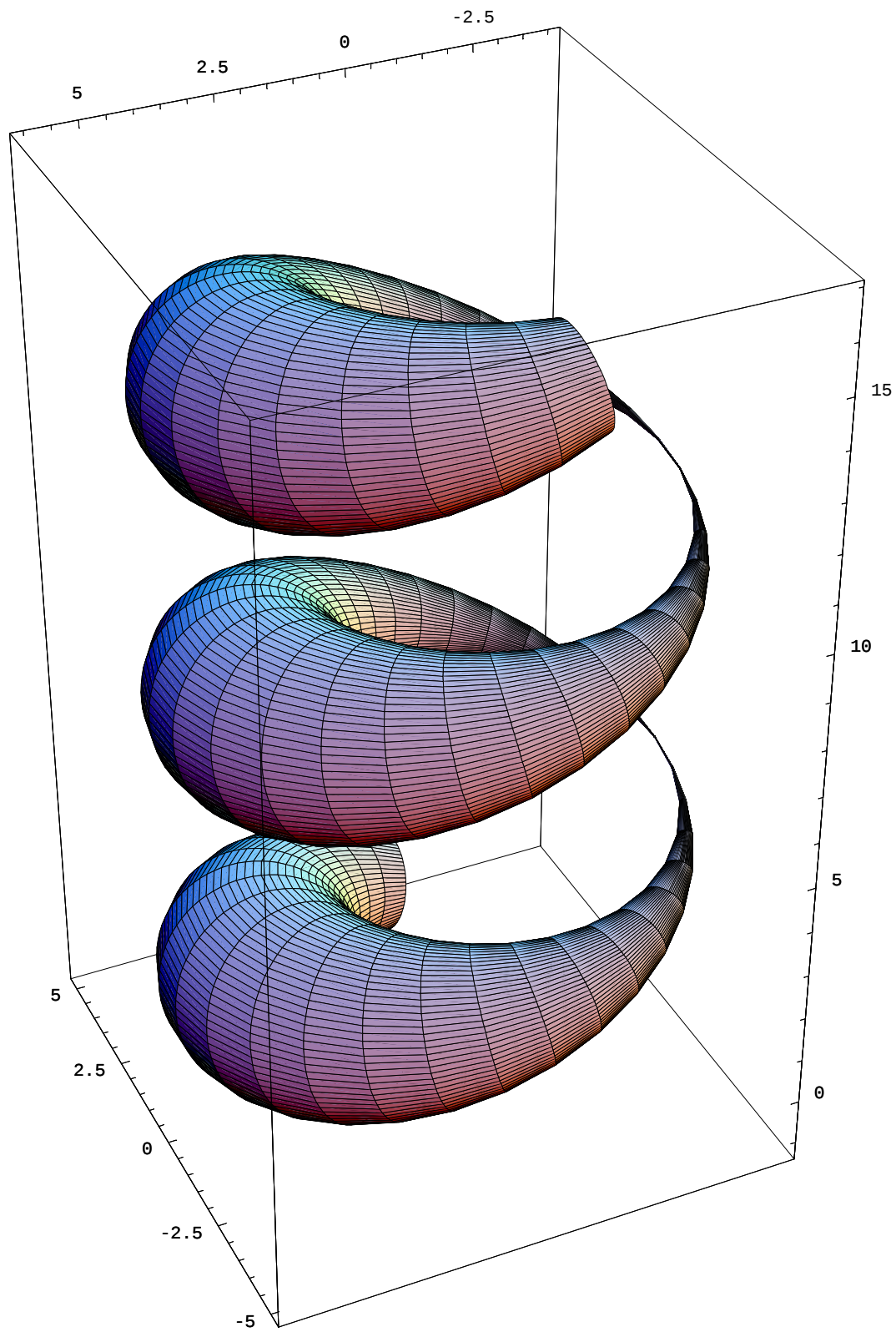
9

```

In[60]:= x[t_] = 4 Cos[t]; y[t_] := 4 Sin[t]; z[t_] := t;
a[t_, φ_] := Sin[t] + 1; b[t_, φ_] := Sin[t] + 1;
from[uhu];
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 5 Pi},
  {φ, 0, 2 Pi}, ViewPoint → {-2.540, 1.173, 1.904}, PlotPoints → 80];

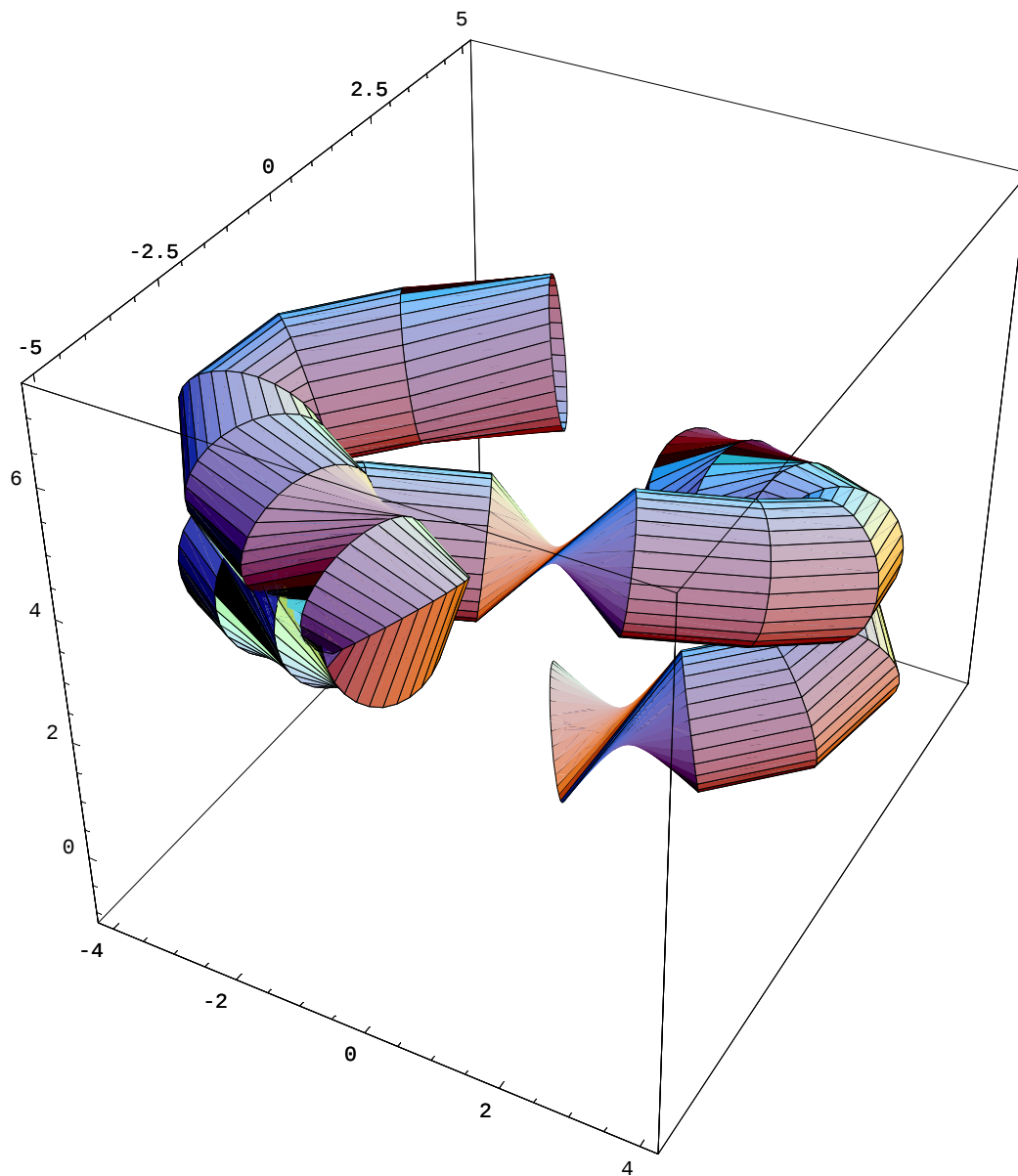
```

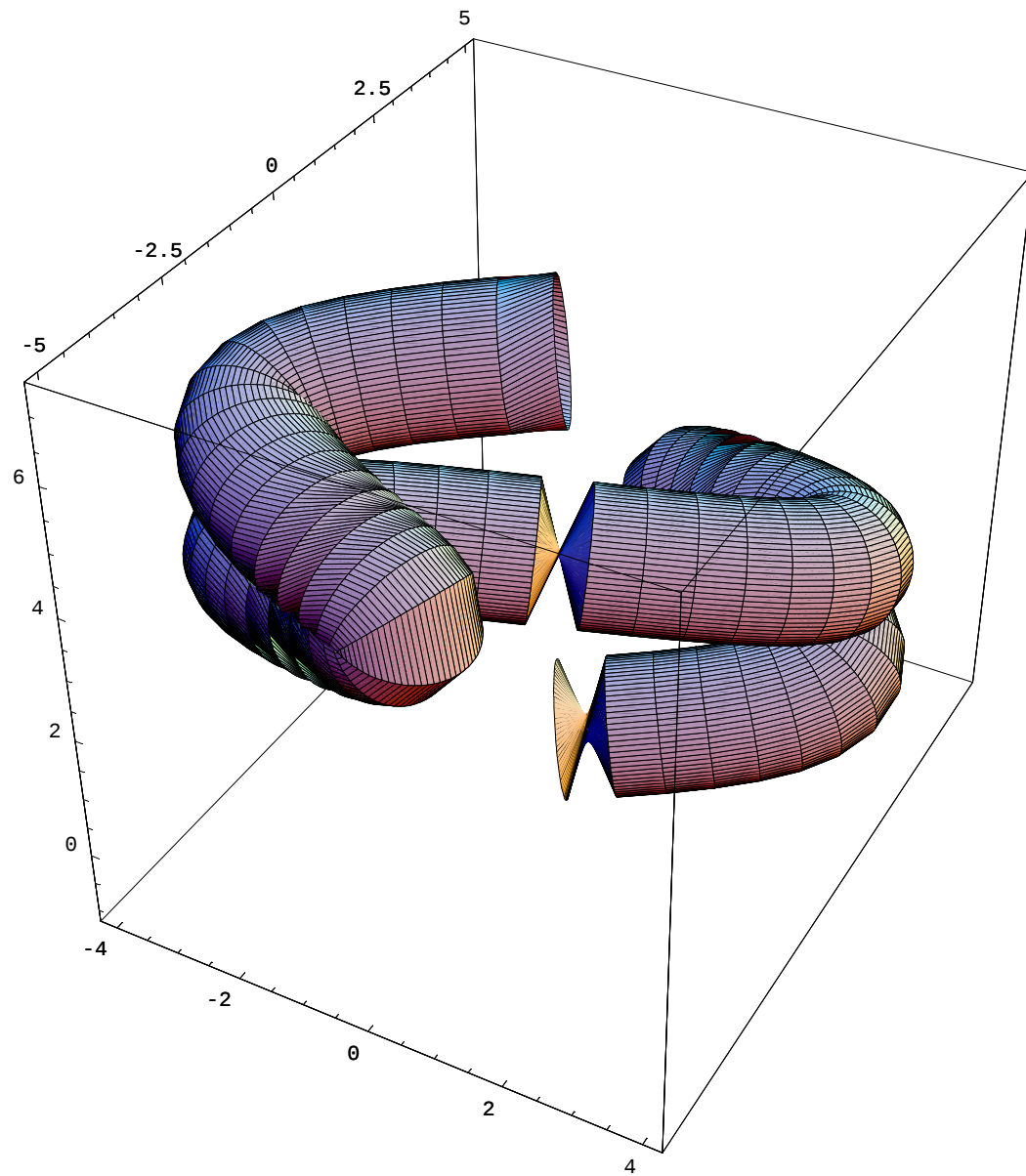




10

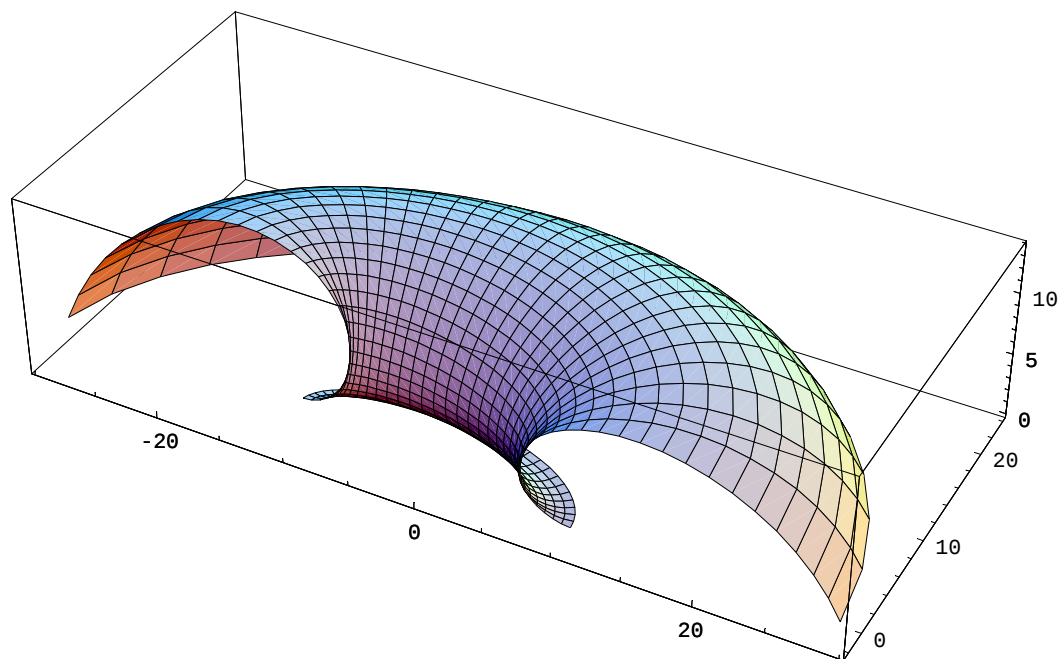
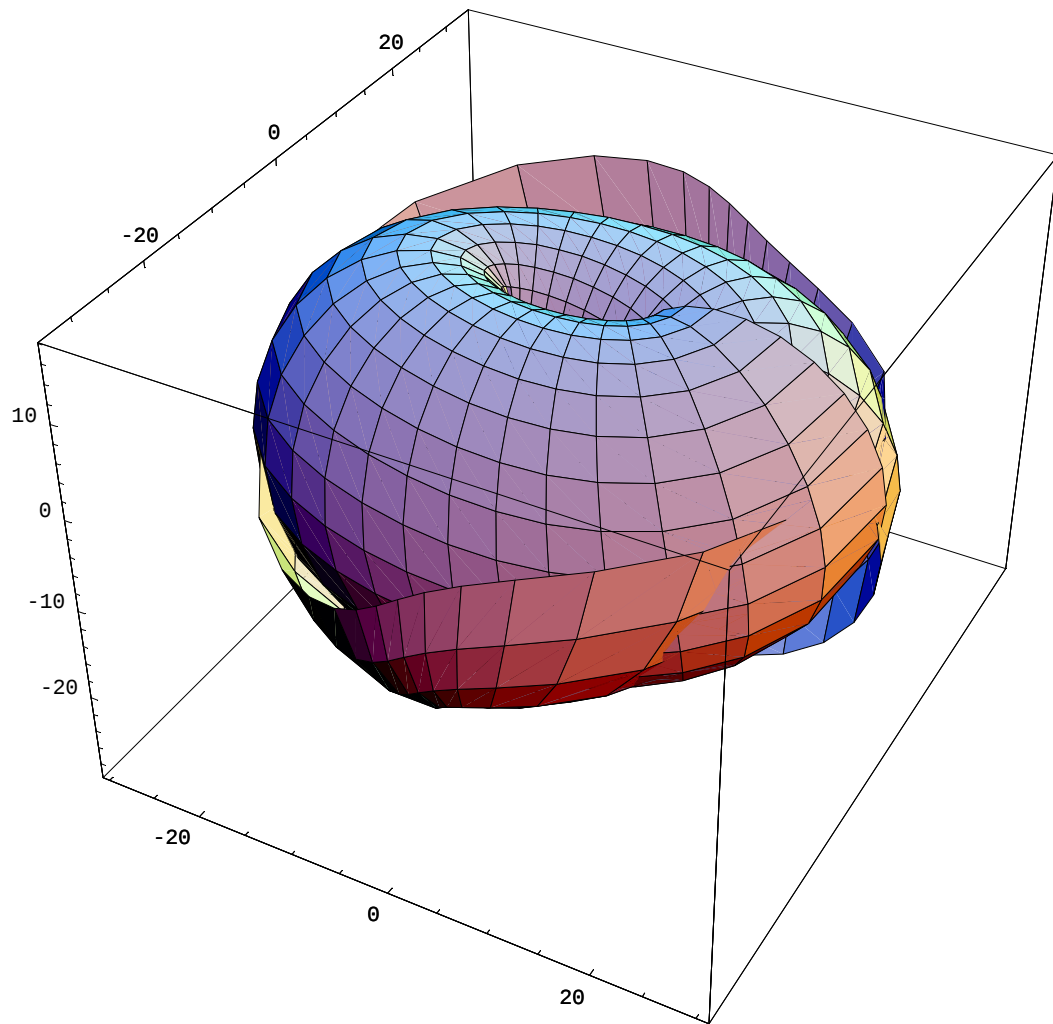
```
In[64]:= x[t_] = 4 Cos[t] Sin[2 t]; y[t_] := 4 Sin[t + 0.01]; z[t_] := t;  
a[t_, φ_] := 1; b[t_, φ_] := 1;  
from[uhu_];  
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, 2 Pi}, {φ, 0, 2 Pi}, PlotPoints → 80];
```





11

```
In[68]:= x[t_] = 10 Cos[t]; y[t_] := 5 Sin[t]; z[t_] := t;
a[t_, φ_] := 3 φ * 2; b[t_, φ_] := 3 φ * 2;
from[uhu_];
ParametricPlot3D[Evaluate[w[t, φ]], {t, 0, Pi}, {φ, 0, Pi}];
```



12

```
In[72]:= x[t_] = 10 Cos[t]; y[t_] := 5 Sin[t]; z[t_] := t;  
a[t_,  $\varphi$ _] :=  $\varphi$  * -2; b[t_,  $\varphi$ _] := 3  $\varphi$  * 2; from[uhu_];  
ParametricPlot3D[Evaluate[w[t,  $\varphi$ ]], {t, 0, 5/4 Pi}, { $\varphi$ , 0, 5/4 Pi};
```

