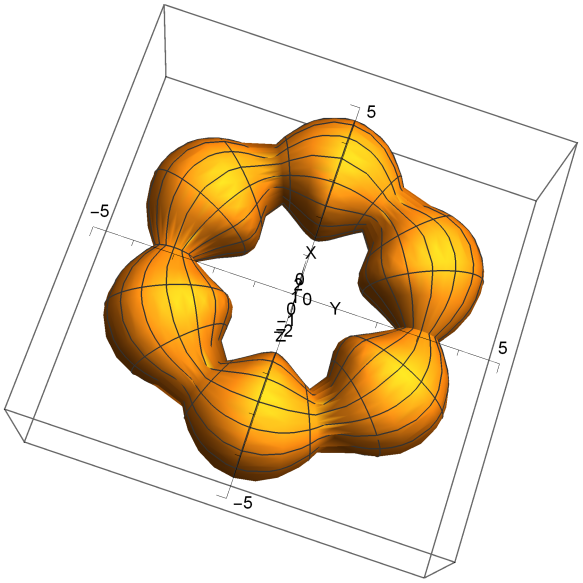
Polar Coordinates: Torus Radius

In[9]:=
```
radius = Abs[Sin[3 t]] + 0.5
distance = (3 + radius * Cos[x])
ParametricPlot3D[{distance * Cos[t], distance * Sin[t], radius * Sin[x]},
 {x, 0, 2 Pi}, {t, 0, 2 Pi}, AxesOrigin → {0, 0, 0},
 AxesLabel → {"X", "Y", "Z"}, PlotRange → {{-5, 5}, {-5, 5}, {-2, 2}}]
```

Out[9]=
$$0.5 + \text{Abs}[\text{Sin}[3\,t]]$$

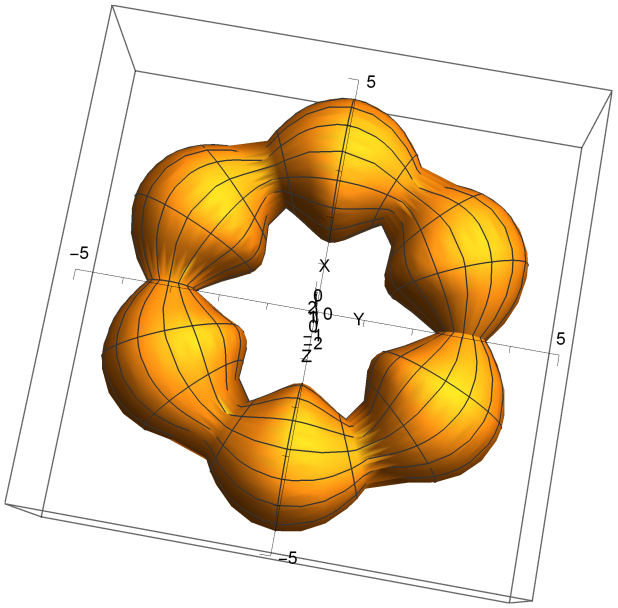
Out[10]=
$$3 + \left(0.5 + \text{Abs}[\text{Sin}[3\,t]]\right) \text{Cos}[x]$$

Out[11]=



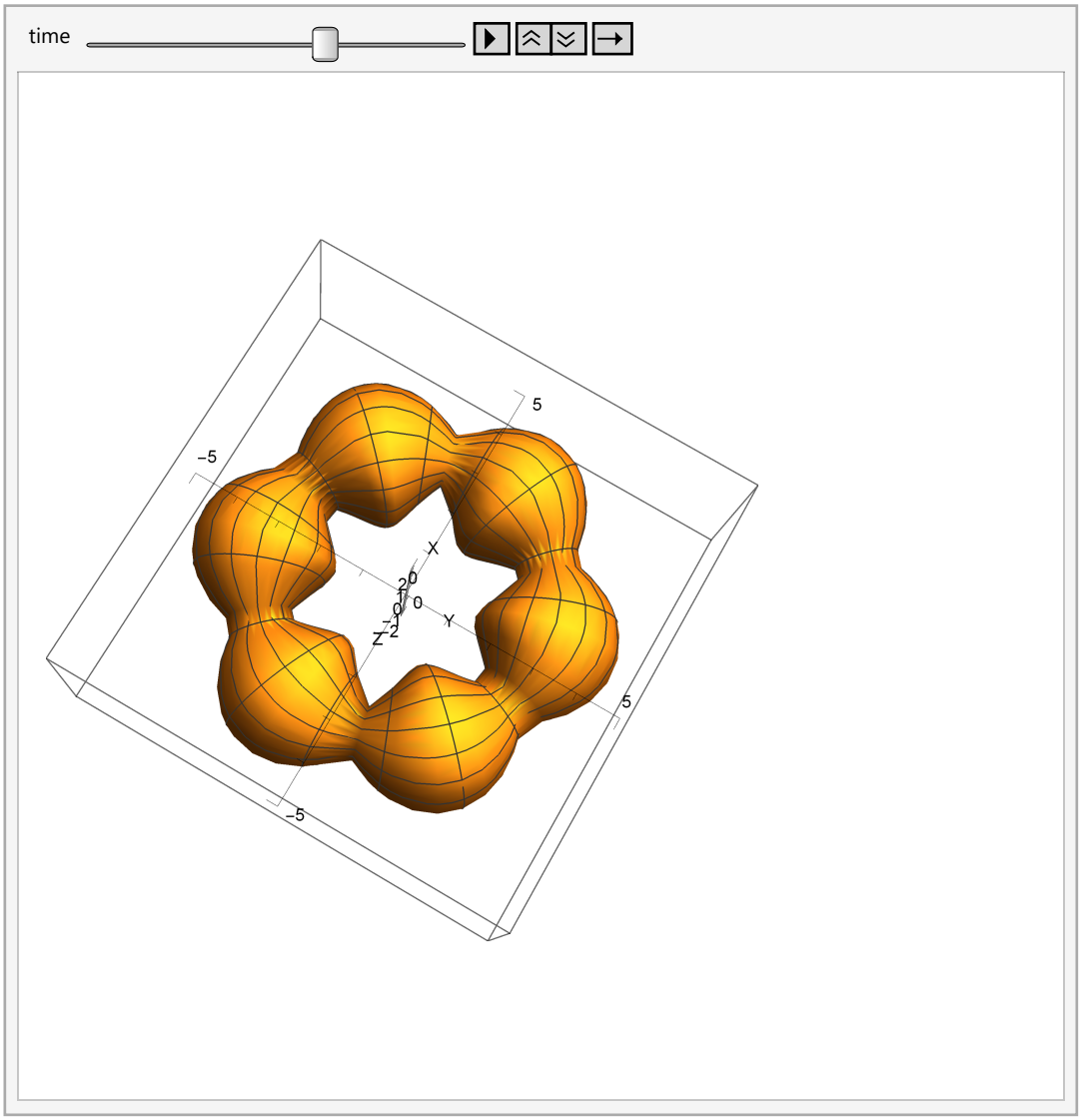
In[12]:=
```
ParametricPlot3D[{(3 + (Abs[Sin[3 t]] + 0.5) * Cos[x]) * Cos[t],
  (3 + (Abs[Sin[3 t]] + 0.5) * Cos[x]) * Sin[t], (Abs[Sin[3 t]] + 0.5) * Sin[x] },
 {x, 0, 2 Pi}, {t, 0, 2 Pi}, AxesOrigin → {0, 0, 0},
 AxesLabel → {"X", "Y", "Z"}, PlotRange → {{-5, 5}, {-5, 5}, {-2, 2}}]
```

Out[12]=



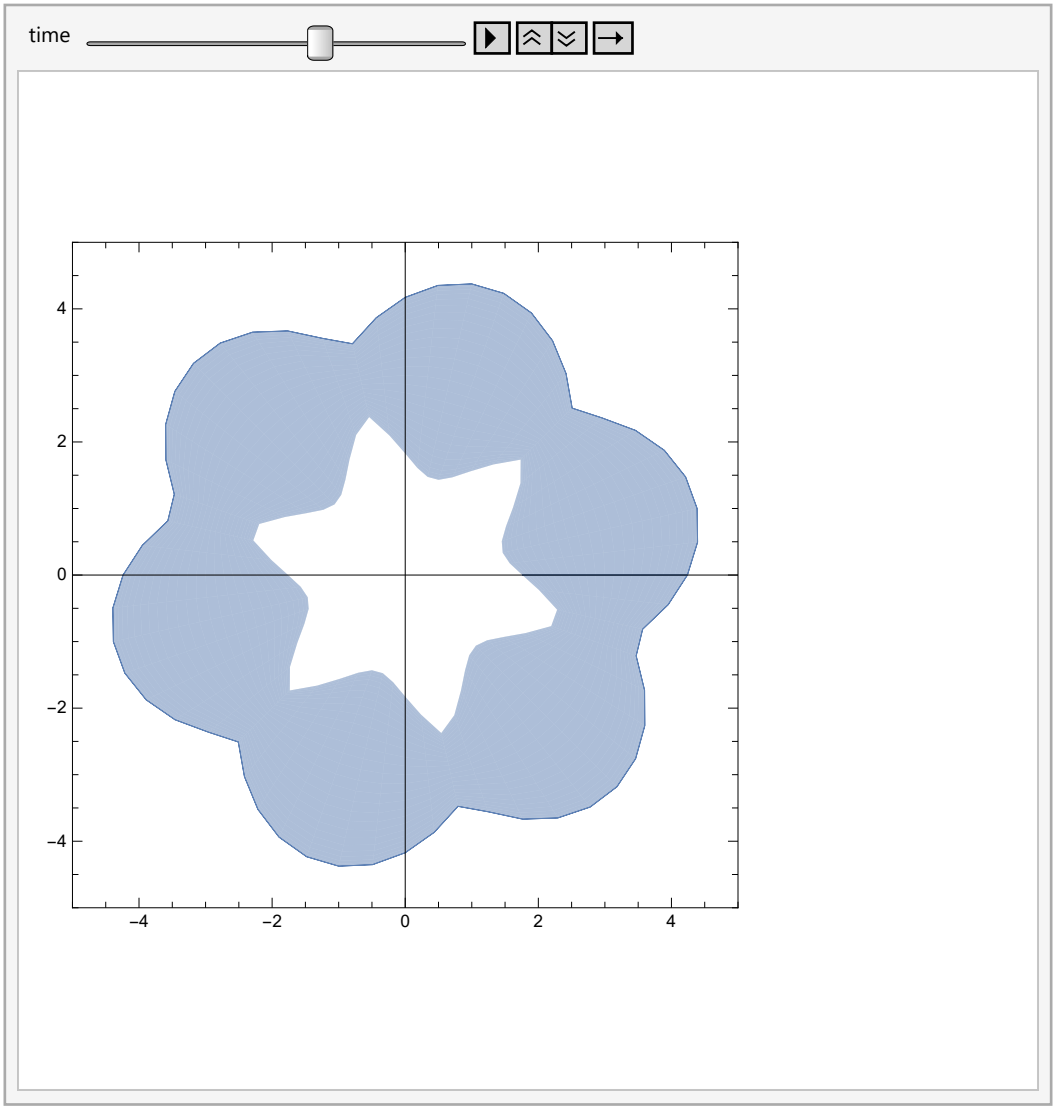
In[13]:=
```
Animate[ParametricPlot3D[{(3 + (Abs[Sin[3 t + time]] + 0.5) * Cos[x]) * Cos[t],
    (3 + (Abs[Sin[3 t + time]] + 0.5) * Cos[x]) * Sin[t],
    (Abs[Sin[3 t + time]] + 0.5) * Sin[x] }, {x, 0, 2 Pi},
  {t, 0, 2 Pi}, AxesOrigin → {0, 0, 0}, AxesLabel → {"X", "Y", "Z"},
  PlotRange → {{-5, 5}, {-5, 5}, {-2, 2}}], {time, 0, 2 Pi}]
```

Out[13]=



In[1]:=
```
Animate[ParametricPlot[{(3 + (Abs[Sin[3 t + time]] + 0.5) * Cos[x]) * Cos[t],
    (3 + (Abs[Sin[3 t + time]] + 0.5) * Cos[x]) * Sin[t]}, {x, 0, 2 Pi},
  {t, 0, 2 Pi}, AxesOrigin → {0, 0, 0}, AxesLabel → {"X", "Y", "Z"},
  PlotRange → {{-5, 5}, {-5, 5}, {-2, 2}}], {time, 0, 2 Pi}]
```

Out[1]=



In[2]:=
```
time2 = 2 Pi + 1; fps = 5; da = 1 / time2; a0 = da;
frames = Table[ParametricPlot[{(3 + (Abs[Sin[3 t + time]] + 0.5) * Cos[x]) * Cos[t],
    (3 + (Abs[Sin[3 t + time]] + 0.5) * Cos[x]) * Sin[t]}, {x, 0, 2 Pi},
  {t, 0, 2 Pi}, AxesOrigin → {0, 0, 0}, AxesLabel → {"X", "Y", "Z"},
  PlotRange → {{-5, 5}, {-5, 5}, {-2, 2}}], {time, a0, da * time2 * fps, da}]
Export["test.mov", frames, "FrameRate" → fps]
```