A 3D CANDLE EQUATION IN CARTESIAN SPACE

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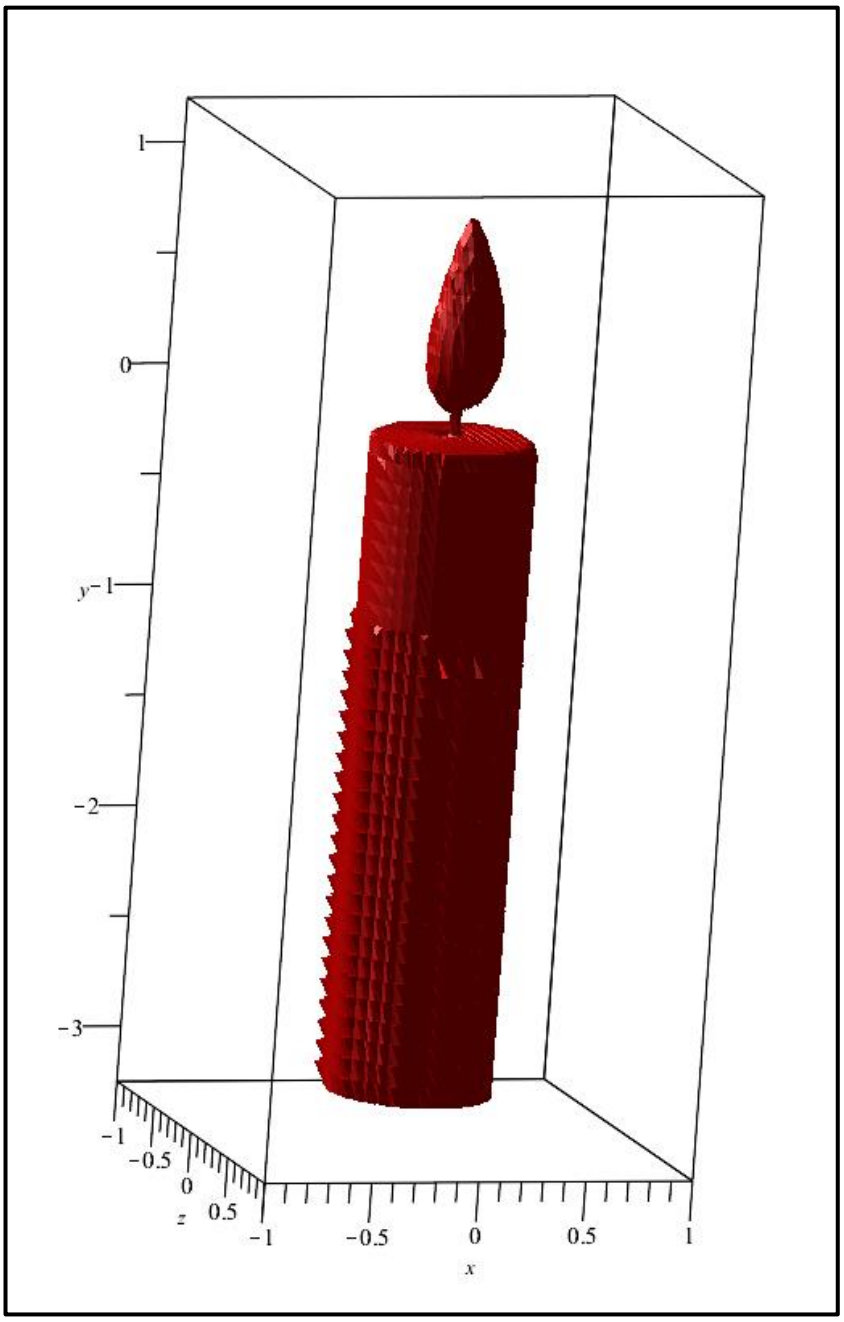
Using Implicit equation in Cartesian space can yield 3D graphs of equation that form an interesting work of art, because Implicit equations can form closed 3D curves. Based on this I can create a closed 3D curve object that forms a Candle, I created this object using a single Implicit equation, in the equation I added a parameter so that the graph can display an animation of the movement of the candle flame.



At first, I making the Implicit Equation of the Tube of the candle, and the equation is:

$$\left|\sqrt{x^2+z^2}+0.25(y+1.62)\right|+\left|\sqrt{x^2+z^2}-0.25(y+1.62)\right|-0.75=0 \quad (1)$$

Second, I making the Implicit Equation of the Tube of the candle wick, and the equation is:

$$\left|\sqrt{x^2+z^2}+0.2y\right|+\left|\sqrt{x^2+z^2}-0.2y\right|-0.028=0 \quad (2)$$

Third, I making the Implicit Equation of the candle flame, and the equation is:

$$2(x^2+z^2)-\frac{\sin(3\sqrt{y})^2}{15}-0.12\,x\sin(3y-a)+y^{200}+0.007=0 \qquad (3)$$

For equation (3) parameter a has value whose changes from 0 to 10

And then I combine all three equations into single Implicit equation become:

$$\left(\left|\sqrt{x^2+z^2}+0.25(y+1.62)\right|+\left|\sqrt{x^2+z^2}-0.25(y+1.62)\right|-0.75\right)\left(\left|\sqrt{x^2+z^2}+0.1y\right|+\left|\sqrt{x^2+z^2}-0.1y\right|-0.059\right)\left(2(x^2+z^2)-\frac{\sin(3\sqrt{y})^2}{15}-0.12\,x\sin(3y-a)+y^{200}+0.007\right)=0$$

writing code in the Maple file become:

```
> with(plots):
> animate(implicitplot3d, [(|sqrt(x^2+z^2)+0.25(y+1.62)|+|sqrt(x^2+z^2)-0.25(y
  +1.62)|-0.75)*(2(x^2+z^2)-sin(3sqrt(y))^2/15-0.12*x*sin(3*y-a)+y^200
  +0.007)*(|sqrt(x^2+z^2)+0.1(y+0)|+|sqrt(x^2+z^2)-0.1(y+0)|-0.059)
  =0, x=-1..1, y=-3.25..1.2, z=-1..1, numpoints=100000], a=0..10, scaling
  =constrained, style=surface, color="DarkRed")
```

Download link for the Maple file:

https://www.mapleprimes.com/view.aspx?sf=220466_post/3D_Candle.mw

(After downloading the file, then open the file, after that press enter three times to generate the Graph equation of 3D Candle)

Youtube link:

https://youtu.be/rljyWAZHsI0?si=Mpd-D1j81OFRxsMj