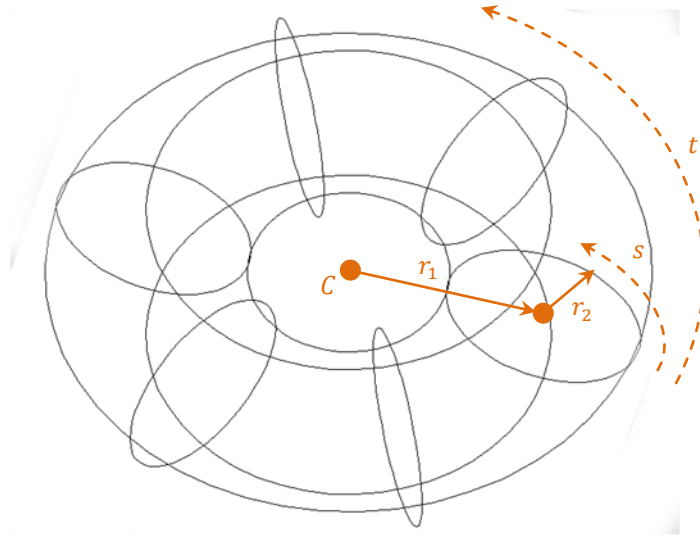


Parametric Torus (Surface)

A parametric torus surface can be defined by a center point C , a radius r_1 from the center of the torus to the center of the circular cross-section, a radius r_2 from the center of the cross-section to the surface, and two parameters s and t .



The parametric torus equation is the parametric circle equation applied in the x - z plane with an offset from the center of the object.

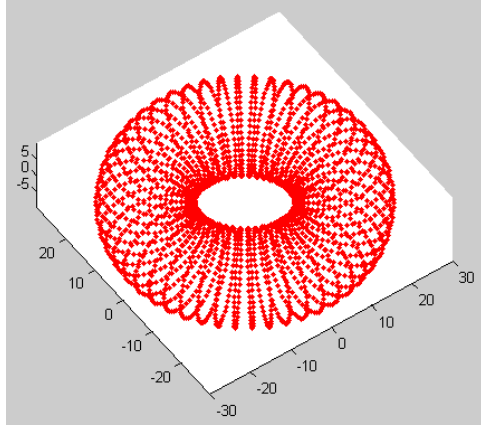
$$\begin{aligned}x_T &= r_1 + r_2 \cdot \cos(2\pi \cdot s) \\y_T &= 0 \\z_T &= r_2 \cdot \sin(2\pi \cdot s)\end{aligned}$$

The circle is then revolved around z -axis about the center point C

$$\begin{aligned}x &= x_C + \cos(2\pi \cdot t) \cdot x_T + \sin(2\pi \cdot t) \cdot y_T \\y &= y_C - \sin(2\pi \cdot t) \cdot x_T + \cos(2\pi \cdot t) \cdot y_T \\z &= z_C + z_T\end{aligned}$$

Expanding the algebra gives:

$$\begin{aligned}x &= x_C + \cos(2\pi \cdot t) \cdot (r_1 + r_2 \cdot \cos(2\pi \cdot s)) \\y &= y_C - \sin(2\pi \cdot t) \cdot (r_1 + r_2 \cdot \cos(2\pi \cdot s)) \\z &= z_C + r_2 \cdot \sin(2\pi \cdot s)\end{aligned}$$



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