The Intersection of Two Cylinders *

The image shows the space curve defined implicitly as the intersection of the two cylinders:

$$y^2 + z^2 = ff$$

and

$$(\cos(aa)x + \sin(aa)y)^2 + (z - cc)^2 = gg.$$

These two cylinders are made visible by displaying a random set of dots on each of them. In the Action Menu one can choose to put more random dots on the boundary of the intersection of the two solid cylinders.

In the default settings the two cylinders touch and the default morph rotates one of them by changing aa.

We find it interesting to change the radius of the smaller cylinder while the cylinders keep touching: morph gg up to ff while keeping $dd = 0$, since we compute (behind the user)

$$cc = \sqrt{ff} - \sqrt{gg} + dd.$$

At $gg = ff$ the intersection curve degenerates into two ellipses (for each aa).

The distance between the tangent planes of the two cylinders (at their common normal) is dd.

H.K.

* This file is from the 3D-XplorMath project. Please see: http://3D-XplorMath.org/