CZ2003 Computer Graphics and Visualization

Lab 5: Morphing

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SSP1

Defining the Required Shapes

Defining two shapes for the following morphing experiment:

Number in attendance list: 1

Numeric part of Lab Group: 1

Therefore, the required shapes are:
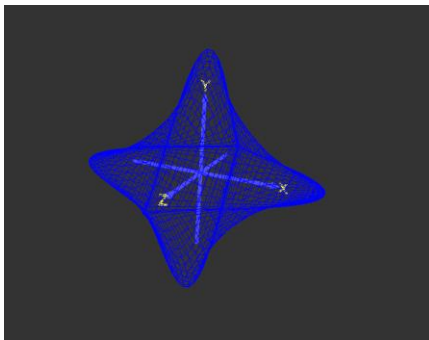
- Formula 1:
- Formula 2:

Formula 1	Formula 2
The first shape to be defined is formula 1. It can be found in the file "**Lab_5_Formula_1.wrl**". The definition of the shape is: $x = 1.6(\cos(\varphi))^3$ $y = 1.6(\cos(\theta)\sin(\varphi))^3$ $z = 1.6\sin(\theta)\sin(\varphi)$ where $0 \le \theta \le 2\pi$ and $0 \le \varphi \le \pi$ By modifying the parameters so that they are in the same range, we get: $x = 1.6(\cos(\pi v))^3$ $y = 1.6(\cos(2\pi u)\sin(\pi v))^3$ $z = 1.6\sin(2\pi u)\sin(\pi v)$ where $0 \le u \le 1$ and $0 \le v \le 1$	The first shape to be defined is formula 1. It can be found in the file "**Lab_5_Formula_2.wrl**". The definition of the shape is: $x = 1.5a\cos(\theta)$ $y = 1.5a\sin(\theta)\cos(\theta)$ $z = 1.5a(\sin(2a\pi))^5$ where $0 \le \theta \le 2\pi$ and $0 \le a \le 1$ By modifying the parameters so that they are in the same range, we get: $x = 1.5v\cos(2\pi u)$ $y = 1.5v\sin(2\pi u)\cos(2\pi u)$ $z = 1.5v(\sin(2\pi v))^5$ where $0 \le u \le 1$ and $0 \le v \le 1$
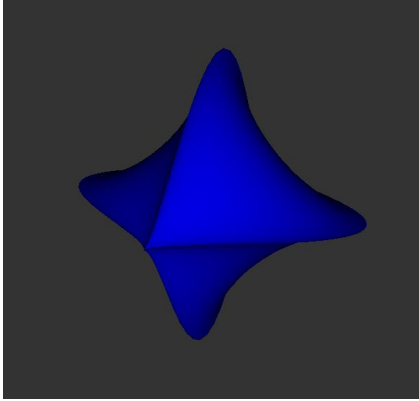
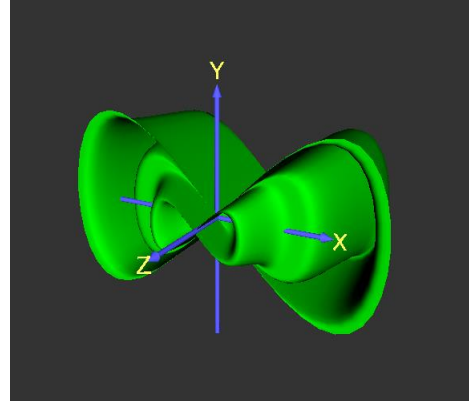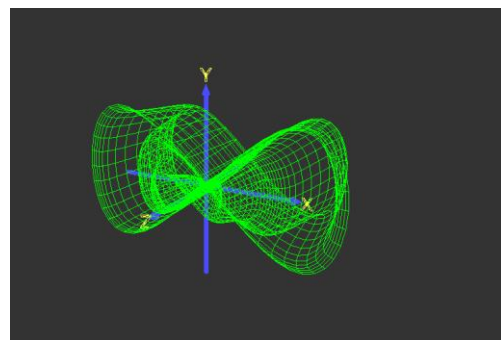|	
Sampling Resolution [50 50] Below is a snapshot of the file "**Lab_5_Formula_1.wrl**": Associated Wireframe: 	Sampling Resolution [50 50] Below is a snapshot of the file "**Lab_5_Formula_2.wrl**": Associated Wireframe

Implementing Morphing of Formula 1 to Formula 2

The morphing is implemented as follows:

$x_1 = 1.6(\cos(\pi v))^3$

$x_2 = 1.5v\cos(2\pi u)$

$x = x_1 + t(x_2 - x_1)$

$y_1 = 1.6(\cos(2\pi u)\sin(\pi v))^3$

$y_2 = 1.5v\sin(2\pi u)\cos(2\pi u)$

$y = y_1 + t(y_2 - y_1)$

$z_1 = 1.6\sin(2\pi u)\sin(\pi v)$

$z_2 = 1.5v(\sin(2\pi v))^5$

$z = z_1 + t(z_2 - z_1)$

The range of t is from [0 1]. But internally it is mapped to a period of 7 seconds. That is, Shape 1 morphs into shape 2 in 7 Seconds.

Domain: [0 1 0 1]

Resolution: [50 50]

Colour:
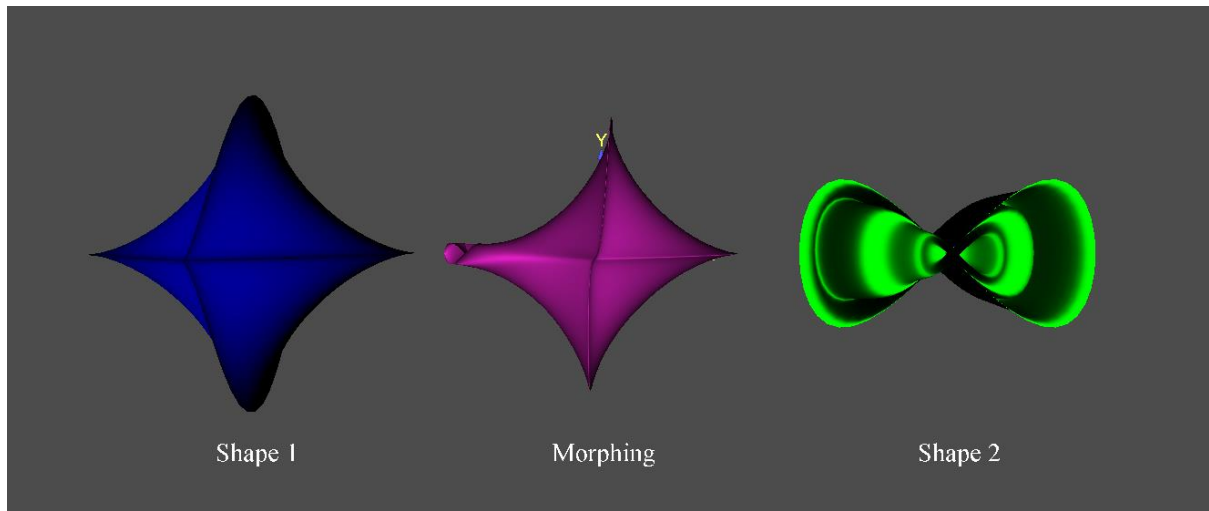
$r = fabs(\sin(4\pi t))$

$g = t$

$b = 1 - t$

Below is a snapshot of "**Morphing.wrl**":

Below is the associated wireframe: