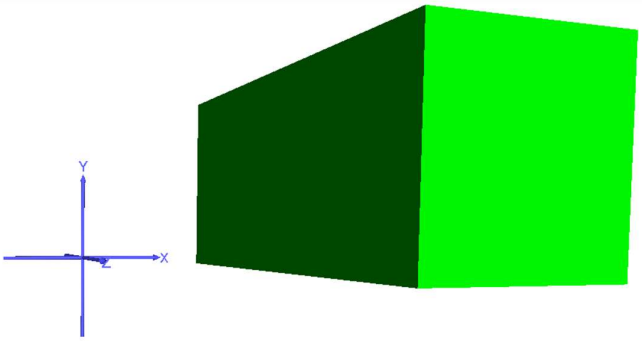
CZ2003: Lab 3

Name: Neo Rui Xuan Berlynn	**Last two digits of the matric card:** 1 and 2

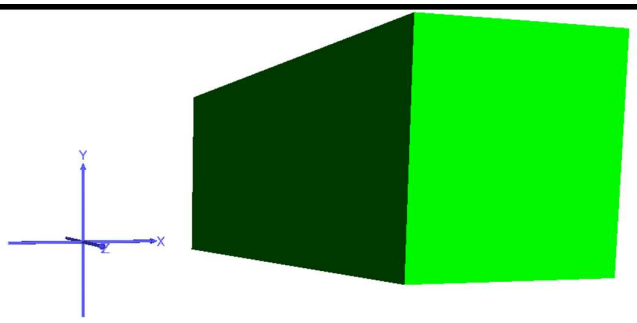
Q1a



$$x = 1 + 2u$$
$$y = 2v$$
$$z = 2 + 4w$$
$$u, v, w \in [0,1]$$

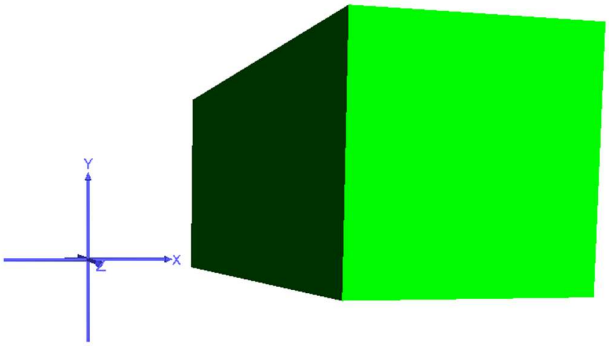
The sampling resolution is [75 75 75].

Name of the file: Lab3_Qn1_a.wrl



Name of the file: Lab3_Qn1_a_SmallR.wrl

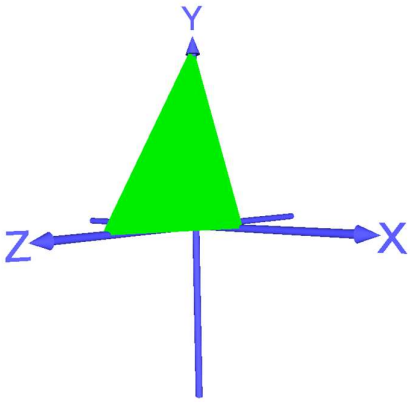
The sampling resolution here is lower at [1 1 1]. There is no change observed as the solid has a linear nature and only one solid is needed to form this solid.



Name of the file: Lab3_Qn1_a_BigR.wrl

The sampling resolution here is higher at [100 100 100]. As explained above, there is no change observed as the solid has a linear nature.

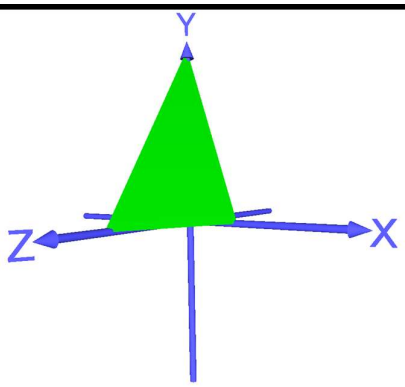
Q1b



$$x = (u - uv)(1 - w)$$
$$y = 3w$$
$$z = (2v)(1 - w)$$
$$u, v, w \in [0,1]$$

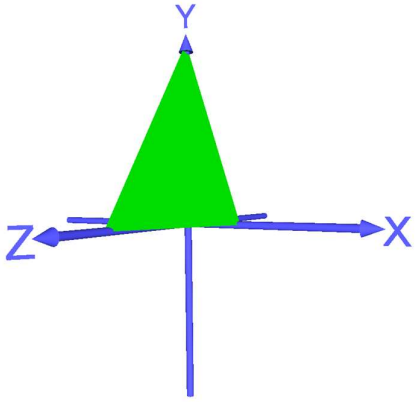
The sampling resolution is [75 75 75].

Name of the file: Lab3_Qn1_b.wrl



Name of the file: Lab3_Qn1_b_SmallR.wrl

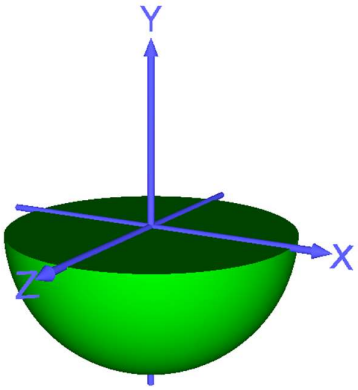
The sampling resolution here is lower at [1 1 1]. There is no change observed as the solid has a linear nature as only one solid is needed to form this solid.



Name of the file: Lab3_Qn1_b_BigR.wrl

The sampling resolution here is higher at [100 100 100]. As explained above, there is no change observed as the solid has a linear nature.

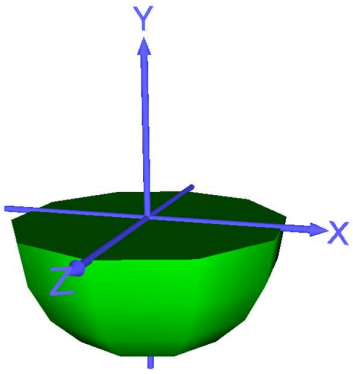
Q1c



$$x = \cos(-\pi u)\sin(2\pi v)\, w$$
$$y = \sin(-\pi u)\, w$$
$$z = \cos(-\pi u)\cos(2\pi v)\, \mathrm{w}$$
$$u, v, w \in [0,1]$$

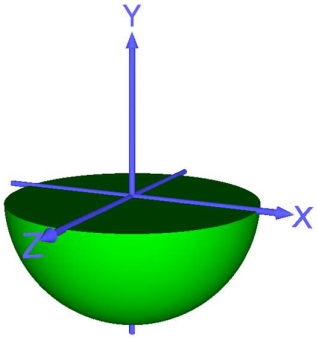
The sampling resolution is [75 75 75].

Name of the file: Lab3_Qn1_c.wrl



Name of the file: Lab3_Qn1_c_SmallR.wrl

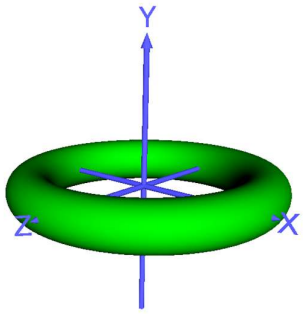
The sampling resolution here is lower at [10 10 10]. The top surface of the solid appears more polygonal, in this case, it is a 10-side polygon as 10 solids for this entire solid.
With an even number resolution, the number of sides of the polygon surface equals the resolution size (e.g. resolution of 4 produces a 4-side polygon surface). With an odd number resolution, the number of sides of the polygon surface equals to 4 times the resolution, as each quadrant of the x-z axis contains the same number of sides as the resolution size.
As the resolution decreases further, the solid appears more “boxy” and less smooth.



Name of the file: Lab3_Qn1_c_BigR.wrl

The sampling resolution here is higher at [200 200 200]. The solid naturally appears more smooth than lower resolutions as more solids (i.e. 200) are used to form this entire solid.

Q1d



$$x = \left(\frac{1}{5}v\ cos(2\pi u) + 1\right)\sin(2\pi w)$$

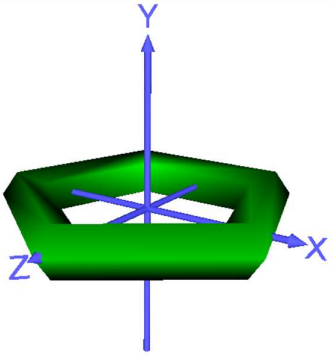
$$y = \frac{1}{5}vsin(2\pi u)$$

$$z = \left(\frac{1}{5}v\ cos(2\pi u) + 1\right)\cos(2\pi w)$$

$$u, v, w \in [0,1]$$

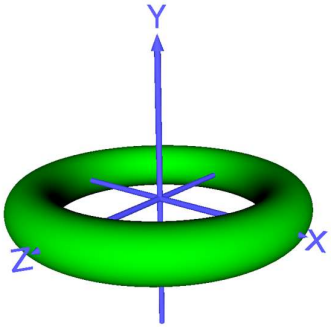
The sampling resolution is [75 75 75].

Name of the file: Lab3_Qn1_d.wrl



Name of the file: Lab3_Qn1_d_SmallR.wrl

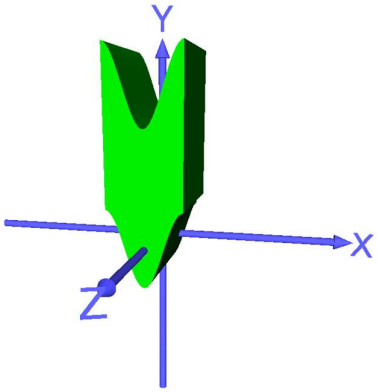
The sampling resolution here is lower at [5 5 5]. The ring appears more polygonal, in this case, it is a 5-side polygon, same as the resolution size. This is because 5 solids are used to form this entire solid. As the resolution decreases, the ring appears even more polygonal as the number of sides and number of solids used to form the entire solid equal the resolution size (e.g. resolution of 3 produces a triangular ring).



Name of the file: Lab3_Qn1_d_BigR.wrl

The sampling resolution here is higher at [200 200 200]. The ring naturally appears more smooth than lower resolutions as more solids (i.e. 200) are now used to form this entire solid.

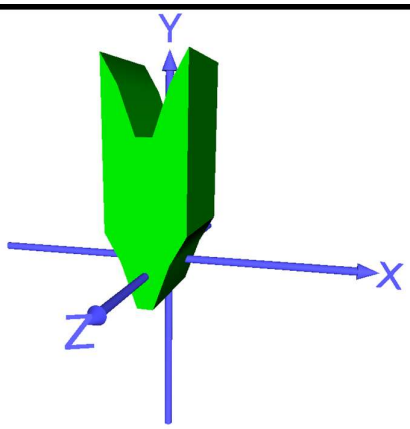
Q2



$$x = -1 + 2u$$
$$y = \cos(2\pi u) + 4w$$
$$z = -1 + 3v$$
$$u, v, w \in [0,1]$$

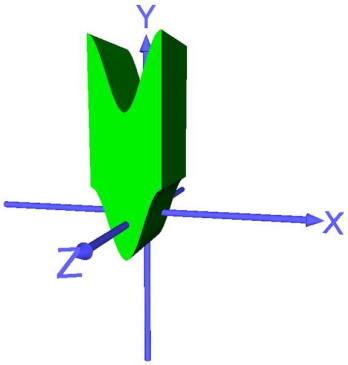
The sampling resolution is [75 75 75].

Name of the file: Lab3_Qn2.wrl



Name of the file: Lab3_Qn2_SmallR.wrl

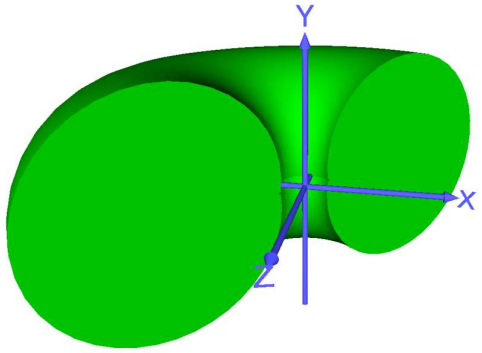
The sampling resolution here is lower at [5 5 5]. The solid appears more boxy and the curve from the previous lab appears to have the same number of sides as the resolution size (e.g. resolution of 3 produces a 3 sided curve). This is because the number of solids used to form this entire solid is equal to the resolution size, in this case 5.



Name of the file: Lab3_Qn2_BigR.wrl

The sampling resolution here is higher at [200 200 200]. The ring naturally appears more smooth than lower resolutions as more solids (i.e. 200) are used to form this entire solid.

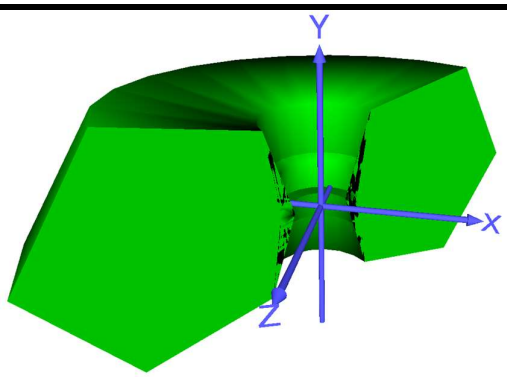
Q3



$$x = \left((1 - 7 * \cos(2\pi u)) * w * \cos(2\pi u) - 1\right) * \sin\left((-v\pi) + 0.75\pi\right)$$
$$y = (1 - 7\cos(2\pi u)) * w * \sin(2\pi u)$$
$$z = \left((1 - 7\cos(2\pi u)) * \mathrm{w} * \cos(2\pi u) - 1\right) * \cos\left((-v\pi) + 0.75\pi\right)$$
$$u, v, w \in [0,1]$$

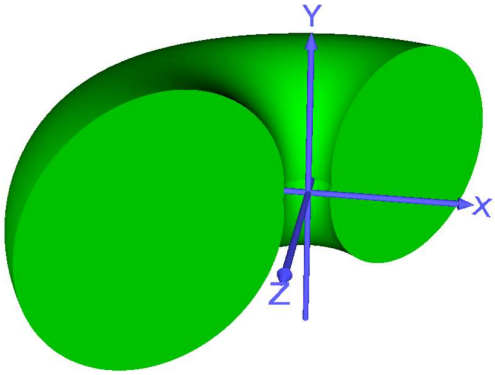
The sampling resolution [75 75 75].

Name of the file: Lab3_Qn3.wrl



Name of the file: Lab3_Qn3_SmallR.wrl

The sampling resolution here is lower at [10 10 10]. The solid appears more boxy. It can also be seen from the top of the surface that there are 10 solids that make up this solid. As the resolution decreases further, the solid appears even more boxy as lesser solids make up the entire solid as the number of small solids equal to the resolution size.



Name of the file: Lab3_Qn3_BigR.wrl

The sampling resolution here is higher at [200 200 200]. The solid naturally appears more smooth than lower resolutions as more solids (i.e. 200) are now used to form this entire solid.