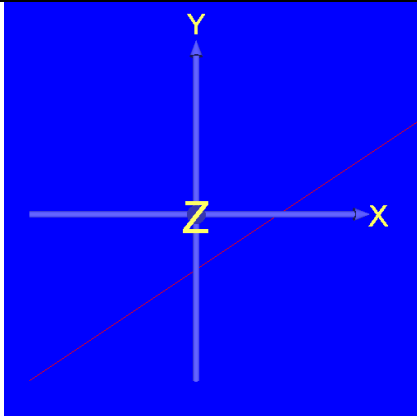
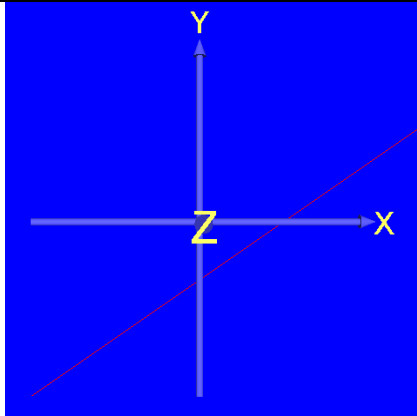
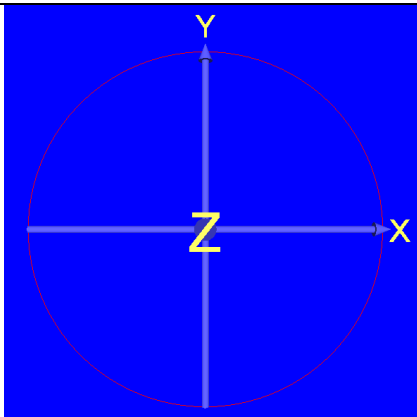
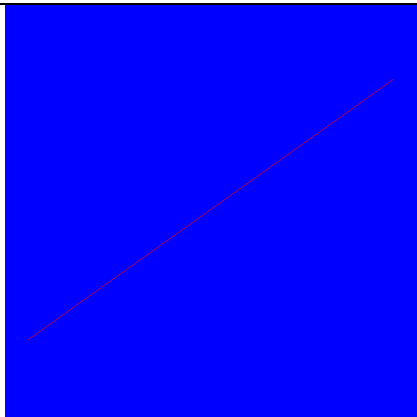


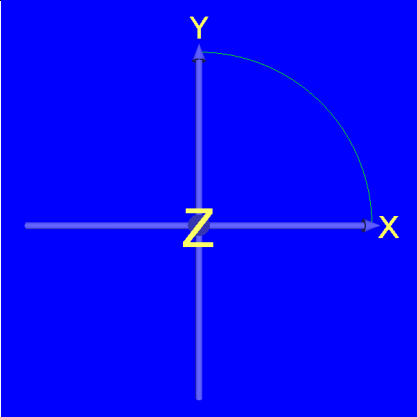
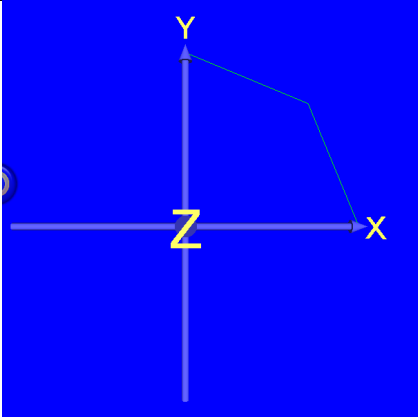
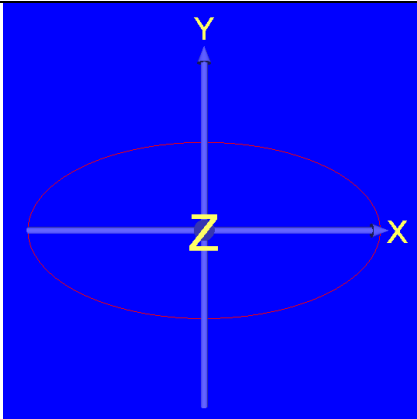
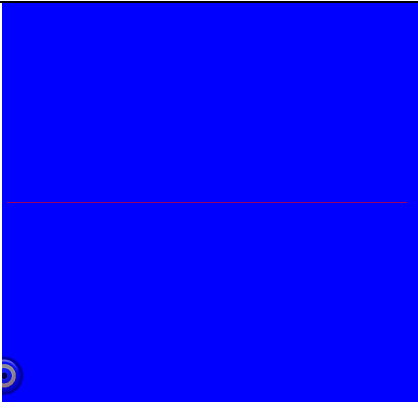
# *LAB 2 REPORT: PARAMETRIC CURVES*

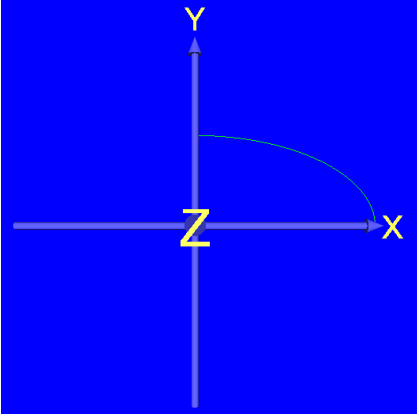
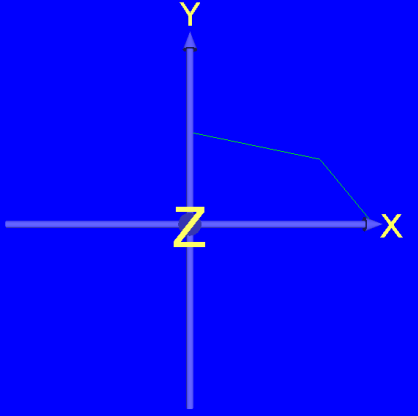
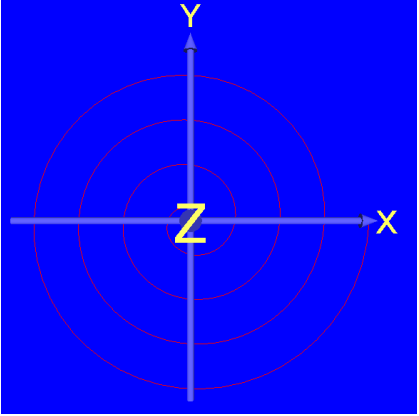
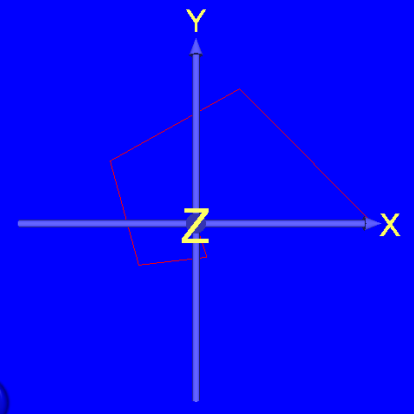
*Escobero Hernández Guillermo (N1804693E) (SSR 1)*

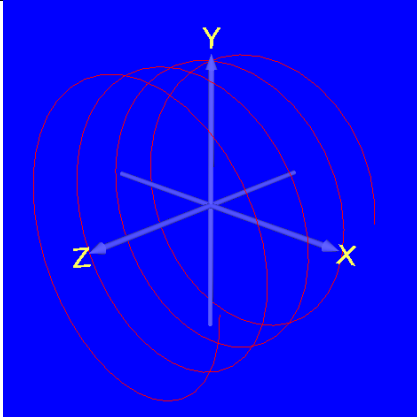
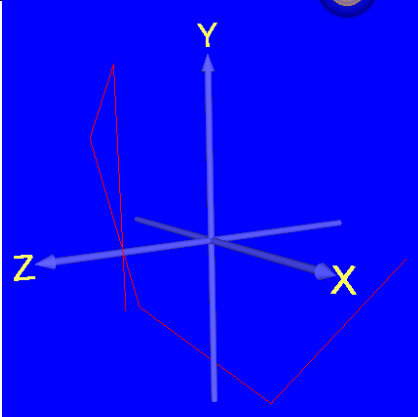
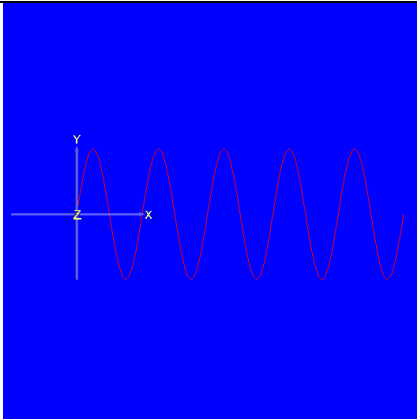
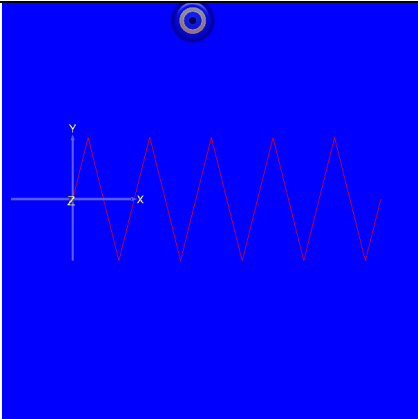
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## Experiment on resolution

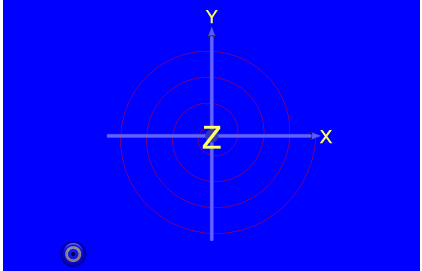
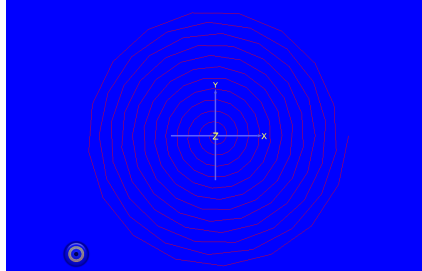
Straight Line		Notes
 <ul style="list-style-type: none"><li>• "straightline.wrl"</li><li>• <math>x=-1+3*u</math> <math>y=-1+2*u</math> <math>z=0</math></li><li>• Parameter domain [0,1]</li><li>• Sampling resolution 100</li></ul>	 <ul style="list-style-type: none"><li>• "straightline2.wrl"</li><li>• <math>x=\cos(\pi/2*u)</math> <math>y=\sin(\pi/2*u)</math> <math>z=0</math></li><li>• Parameter domain [0,1]</li><li>• Sampling resolution 100</li></ul>	The sampling resolution for straight line can be set as minimum as 1 and nothing will change because it basically only requires one straight line to create a straight line.
Circle		
 <ul style="list-style-type: none"><li>• "circle.wrl"</li><li>• <math>x=\cos(2*\pi*u)</math> <math>y=\sin(2*\pi*u)</math> <math>z=0</math></li><li>• Parameter domain [0,1]</li><li>• Sampling resolution 100</li></ul>	 <ul style="list-style-type: none"><li>• "circle2.wrl"</li><li>• <math>x=\cos(2*\pi*u)</math> <math>y=\sin(2*\pi*u)</math> <math>z=0</math></li><li>• Parameter domain [0,1]</li><li>• Sampling resolution 2</li></ul>	The more the number of samples used, the more accurate and smooth the circle will be. This is because the circle is created by joining multiple straight lines together between points defined in the formula. For resolution = 2, we obtain a straight line (x axis).

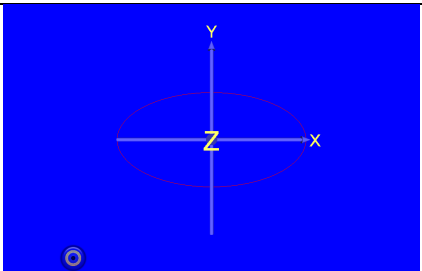
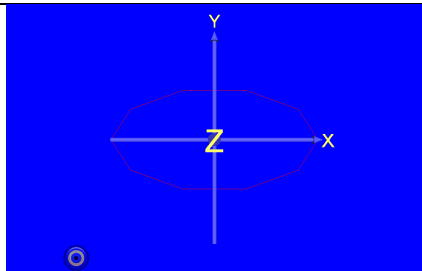
Circle arc		
 <ul style="list-style-type: none"> <li>• "circlearc.wrl"</li> <li>• <math>x=\cos(\pi/2*u)</math> <math>y=\sin(\pi/2*u)</math> <math>z=0</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 100</li> </ul>	 <ul style="list-style-type: none"> <li>• "circlearc.wrl"</li> <li>• <math>x=\cos(\pi/2*u)</math> <math>y=\sin(\pi/2*u)</math> <math>z=0</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 2</li> </ul>	<p>With only one sample, it will become a straight line. Hence, the higher the resolution the better.</p>
Ellipse		
 <ul style="list-style-type: none"> <li>• "ellipse.wrl"</li> <li>• <math>x=1*\cos(2*\pi*u)</math> <math>y=0.5*\sin(2*\pi*u)</math> <math>z=0</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 100</li> </ul>	 <ul style="list-style-type: none"> <li>• "ellipse2.wrl"</li> <li>• <math>x=1*\cos(2*\pi*u)</math> <math>y=0.5*\sin(2*\pi*u)</math> <math>z=0</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 2</li> </ul>	<p>This case is the same as the circle, we get a straight line on the x-axis if we use a resolution of 2. We get two points on the x-axis.</p>

Ellipse arc		
 <ul style="list-style-type: none"> <li>• “ellipsearch.wrl”</li> <li>• <math>x=1*\cos(\pi/2*u)</math> <math>y=0.5*\sin(\pi/2*u)</math> <math>z=0</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 100</li> </ul>	 <ul style="list-style-type: none"> <li>• “ellipsearch2.wrl”</li> <li>• <math>x=1*\cos(\pi/2*u)</math> <math>y=0.5*\sin(\pi/2*u)</math> <math>z=0</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 2</li> </ul>	<p>With only one sample, it will become a straight line. Hence, the higher the resolution the better.</p>
Spiral		
 <ul style="list-style-type: none"> <li>• “spiral.wrl”</li> <li>• <math>x=u*\cos(u*8*\pi)</math> <math>y=u*\sin(u*8*\pi)</math> <math>z=0</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 200</li> </ul>	 <ul style="list-style-type: none"> <li>• “spiral2.wrl”</li> <li>• <math>x=u*\cos(u*8*\pi)</math> <math>y=u*\sin(u*8*\pi)</math> <math>z=0</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 5</li> </ul>	<p>If resolution chosen in this case is 2, we get again a straight line.</p>

Helix		
 <ul style="list-style-type: none"> <li>• "helix.wrl"</li> <li>• <math>x=1*\cos(u*8*\pi)</math> <math>y=1*\sin(u*8*\pi)</math> <math>z=-0.5+1.5*u</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 150</li> </ul>	 <ul style="list-style-type: none"> <li>• "helix2.wrl"</li> <li>• <math>x=1*\cos(u*8*\pi)</math> <math>y=1*\sin(u*8*\pi)</math> <math>z=-0.5+1.5*u</math></li> <li>• Parameter domain [0,1]</li> <li>• Sampling resolution 5</li> </ul>	<p>When the number of sampling is equivalent to the rotation multiplier, it will create a zig zag line on x and z axis.</p>
Parametric sine		
 <ul style="list-style-type: none"> <li>• "parametricsine.wrl"</li> <li>• <math>x=u</math> <math>y=\sin(2*\pi*u)</math></li> <li>• Parameter domain [0,1].</li> <li>• Sampling resolution 100</li> </ul>	 <ul style="list-style-type: none"> <li>• "parametricsine2.wrl"</li> <li>• <math>x=u</math> <math>y=\sin(2*\pi*u)</math></li> <li>• Parameter domain [0,1].</li> <li>• Sampling resolution 20</li> </ul>	<p>If resolution chosen in this case is 2, we get again a straight line. In this case, I have set the resolution to 20. Incrementing the resolution will round the peaks of the sine wave.</p>

## Experiment on parameter domain

Spiral (spiral.wrl)	
 <ul style="list-style-type: none"> <li>• <math>x = u \cdot \cos(u \cdot 8 \cdot \pi)</math></li> <li>• <math>y = u \cdot \sin(u \cdot 8 \cdot \pi)</math></li> <li>• <math>z = 0</math></li> <li>• Parameter domain <math>[0, 1]</math></li> <li>• Sampling resolution 200</li> </ul>	 <ul style="list-style-type: none"> <li>• <math>x = u \cdot \cos(u \cdot 8 \cdot \pi)</math></li> <li>• <math>y = u \cdot \sin(u \cdot 8 \cdot \pi)</math></li> <li>• <math>z = 0</math></li> <li>• Parameter domain <math>[0, 3]</math></li> <li>• Sampling resolution 200</li> </ul>
<p>When the parameter domain increased, it will elongate the number of rotation. When the curve is elongated, the sampling resolution has to be increased as well to generate a smooth curve. We need to increase the resolution too, as we have a wider range for the parameter with the same number of calculations.</p>	

Ellipse (ellipse.wrl)	
 <ul style="list-style-type: none"> <li>• <math>x = 1 \cdot \cos(2 \cdot \pi \cdot u)</math></li> <li>• <math>y = 0.5 \cdot \sin(2 \cdot \pi \cdot u)</math></li> <li>• <math>z = 0</math></li> <li>• Parameter domain <math>[0, 1]</math></li> <li>• Sampling resolution 100</li> </ul>	 <ul style="list-style-type: none"> <li>• <math>x = 1 \cdot \cos(2 \cdot \pi \cdot u)</math></li> <li>• <math>y = 0.5 \cdot \sin(2 \cdot \pi \cdot u)</math></li> <li>• <math>z = 0</math></li> <li>• Parameter domain <math>[0, 10]</math></li> <li>• Sampling resolution 100</li> </ul>
<p>When the parameter domain increased, it will elongate the number of rotation. But in this case, as the curve is closed (with a circle will happen the same), the elongation is rotating on the same axis. To display a smooth curve, we need to increase the resolution too, as we have a wider range for the parameter with the same number of calculations.</p>	