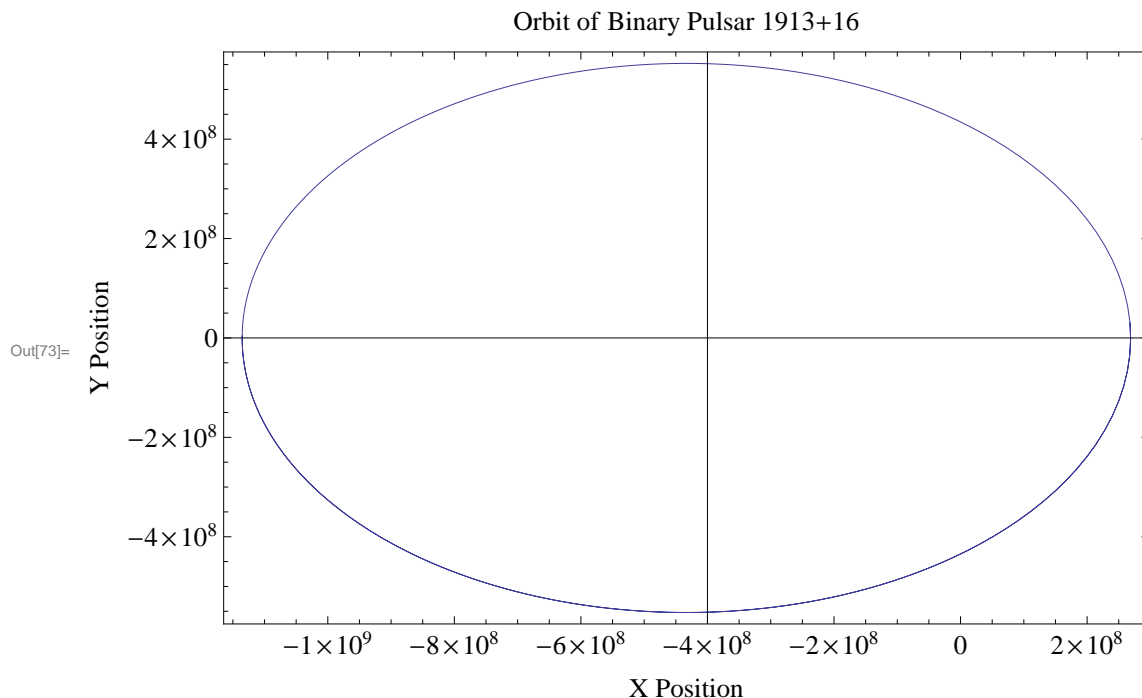


# Lab 6 - Roots

```
In[59]:= Needs["PlotLegends`"]  
dir = NotebookDirectory[];  
SetDirectory[dir];
```

Calculate the orbit for the pulsar

```
In[62]:= e = 0.617139;  
T = 27 906.98161;  
c = 299 792 458;  
a = 2.34186 * c;  
  
In[66]:= ts = Table[t, {t, -14 000, 28 000, 100}];  
  
In[67]:= eqs = Map[Function[t, T / (2 * Pi) * (x - e * Sin[x]) - t], ts];  
  
In[68]:= zeros = Map[Function[f, FindRoot[f, {x, 0}]], eqs][[All, 1, 2]];  
  
In[69]:= rs = Map[Function[z, a * (1 - e * Cos[z])], zeros];  
  
In[70]:= xs = Map[Function[z, a * (Cos[z] - e)], zeros];  
  
In[71]:= ys = Map[Function[z, a * (Sqrt[1 - e^2] * Sin[z])], zeros];  
  
In[72]:= data = Transpose[{xs, ys}];  
  
In[73]:= graph = ListPlot[data, Joined → True, AxesOrigin → {-4 * 10^8, 0}, Frame → True,  
FrameLabel → {"Y Position", ""}, {"X Position", "Orbit of Binary Pulsar 1913+16"}},  
ImageSize → Large, LabelStyle → Larger]
```



```
In[74]:= Export["orbitMath.png", graph]
```

Out[74]= orbitMath.png

```
In[75]:= Export["orbitCalc.pdf", EvaluationNotebook[]]
```

```
Out[4]= orbitCalc.pdf
```