AST 304 Project1 ODE Orbital Mechanics

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**RK2**

When the step size is large the orbit is not closed.

When the step size is small the orbit is closed, the semi-major axis is correct, the orbit is an ellipse.

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**RK4**

When the step size is large the orbit is not closed.

When the step size is small the orbit is closed, the semi-major axis is correct, the orbit is an ellipse.

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**Euler**

When the step size is large the orbit is not closed.

When the step size is small the orbit is closed, the semi-major axis is correct, the orbit is an ellipse.

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**Error Analysis**

The Euler method is expected to be the worst scaling, so this scaling is expected.

RK4 and RK2 are expected to do better Euler which we can see. RK4 is expected to do better than RK2 at larger step sizes which we can see.

In this case its better to do a logarithmic plot so that we can better compare the change in error for each step size.

