Ay190 – Worksheet 04 Writeup
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1 Exercise 1

1.1 1a

We have an eccentricity $e = .0167$. No. Iter in the table below indicates number of iterations for convergence to a relative error $h < 10^{-10}$. X,Y are as defined in WS4.

Time t (days)	E	No. Iter	X	Y
t=91	1.5820922889916236	4	-0.0112957219731	0.99979675547
t=182	3.1309642006817362	3	-0.999943518526	0.0106267706437
t=273	4.6794891005321526	4	-0.0328939450239	-0.99931946851

I provide two py files in Github. test.py uses the While function, a.py does not. The latter converges slightly faster.

1.2 1b

Now our eccentricity is $e = .99999$.

Time t (days)	E	No. Iter	X	Y
t=91	2.3066463874889318	98	-0.671217514443	0.0033150092035
t=182	3.1361896410659678	50	-0.999985403763	2.41628286026e-05
t=273	3.9636437776514937	35	-0.680720102446	-0.00327602643158

To improve convergence, we could simply increase our function dE by defining $dE = f(E)/df(E) \times$ *constant* or simply absorbing that constant and forming a new f(E), df(E).