

Quiz 3 - Solution

Here is an example of code that will help solve the problem.

```
[1] function x = quiz3(A,dt,T)
[2]     t = 0:dt:T;
[3]     N = length(t);
[4]     x = NaN(1,N);
[5]     v = NaN(1,N);
[6]     x(1) = A;
[7]     v(1) = 0;
[8]     for n = 1:N-1
[9]         a = -3*x(n)^3;
[10]        x(n+1) = x(n) + v(n)*dt;
[11]        v(n+1) = v(n) + a*dt;
[12]     end
[13]     plot(t,x)
[14] end
[15]
```

By trial and error it seemed that it took a time step of about $dt = 0.0001$ in order to be stable.

(a) Calling this code as `quiz3(1,0.0001,5)` and then zooming in on the second peak we find that the period is about 4.28 when the amplitude is 1.

(b) Calling this code as `quiz3(2,0.0001,5)` and then zooming in on the second peak we find that the period is about 2.14 when the amplitude is 2.