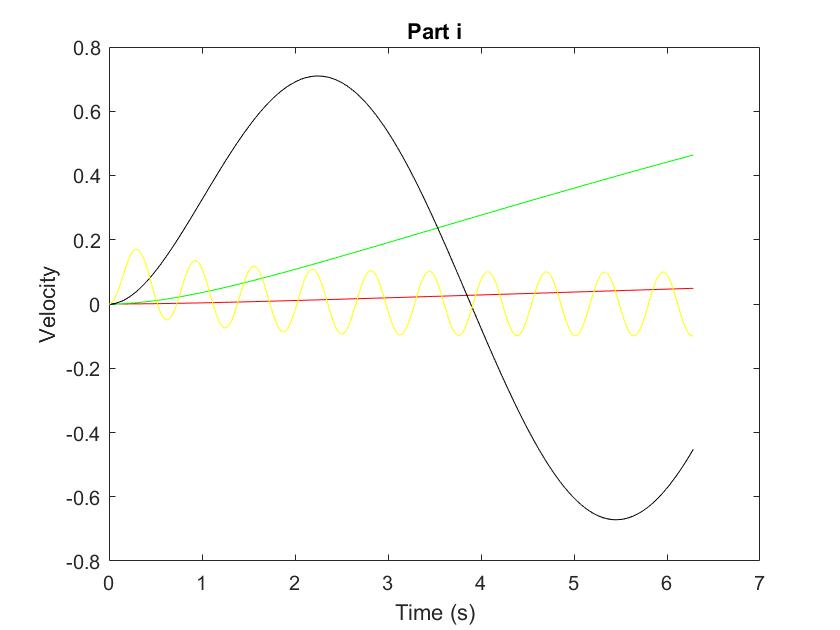
3c) The solution for Part i is shown below, where w0 = 0.01 is shown in red, w0 = 0.1 is shown in green, w0 = 1 is shown in black, and w0 = 10 is shown in yellow.



I was unable to succeed in producing this graph for parts ii and iii.

The code I used is shown below:

**ode45\_solver.m**

% v' = (-a/m) + u + w

time\_period = linspace(0, 2\*pi, 1000);

initial = 0;

[t, v] = ode45(@pi\_function, time\_period, initial);

**pi\_function.m**

function [ dv\_dt ] = pi\_function( t, v )

%PI\_FUNCTION Proportional-integral control law

% Detailed explanation goes here

% Defining constants

m = 1;

a = 0.1;

w = 0;

% Defining u

w0 = 1;

v\_ref = sin(w0 \* t);

kp = 1;

ki = 1;

u = -kp \* (v - v\_ref) - ki \* integral( @(t) v\_ref - v, 0, t, 'ArrayValued', 1);

dv\_dt = (-a/m) \* v + (1/m) \* u + w;

end