ME 1020 Engineering Programming with MATLAB

Problem 9.5:

5. A certain object's acceleration is given by $a(t) = 7t\,\sin(5t)$ m/s². Compute and plot its acceleration and velocity as functions of time from $0 \le t \le 10$ seconds if its initial velocity is zero. Place both graphs on the same plot. Also compute the velocity at $t = 10$ seconds.

```matlab
% Problem 9.5
clear
clc
disp('Problem 9.5: Scott Thomas')

% Create an anonymous function for a(t) = 7*t.*sin(5*t)

aoft = @(t) (7*t.*sin(5*t));
N = 10001;
t = linspace(0,10.0,N);
a = aoft(t);

v(1) = 0.0;
for k = 1:N-1
v(k+1) = v(k) + 0.5*(t(k+1) - t(k))*(a(k) + a(k+1));
end
v(N)

plot(t,a, t,v), xlabel('t (sec)')
ylabel('Acceleration and Velocity')
title('Problem 9.5: Scott Thomas')
legend('a (m/s^2)', 'v (m/s)','Location', 'NorthWest')
```

```
Problem 9.5: Scott Thomas

ans =

  -1.3583e+01
```