Table of Contents


```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%
% CODE CHALLENGE 7 - Template Script
%
% The purpose of this challenge is to estimate the velocity and
 kenitic
% energy profile of a falling object.
%
% To complete the challenge, execute the following steps:
% 1) Set an initial condition velocity
% 2) Set values for constants
% 3) Propagate freefall w/ drag for 20 seconds
% 4) Plot the velocity vs. time
% 5) Calculate the change kinetic energy vs. time
% 6) Plot the change in kinetic energy vs. time
%
% NOTE: DO NOT change any variable names already present in the code.
%
% Upload your team's script to Gradescope when complete.
%
% NAME YOUR FILE AS Challenge7_Sec{section number}_Group{group
 breakout #}.m
% ***Section numbers are 1 or 2***
% EX File Name: Challenge7_Sec1_Group15.m
%
% STUDENT TEAMMATES
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%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%
```

Housekeeping

```
clear variables; close all; clc;
```

Set up

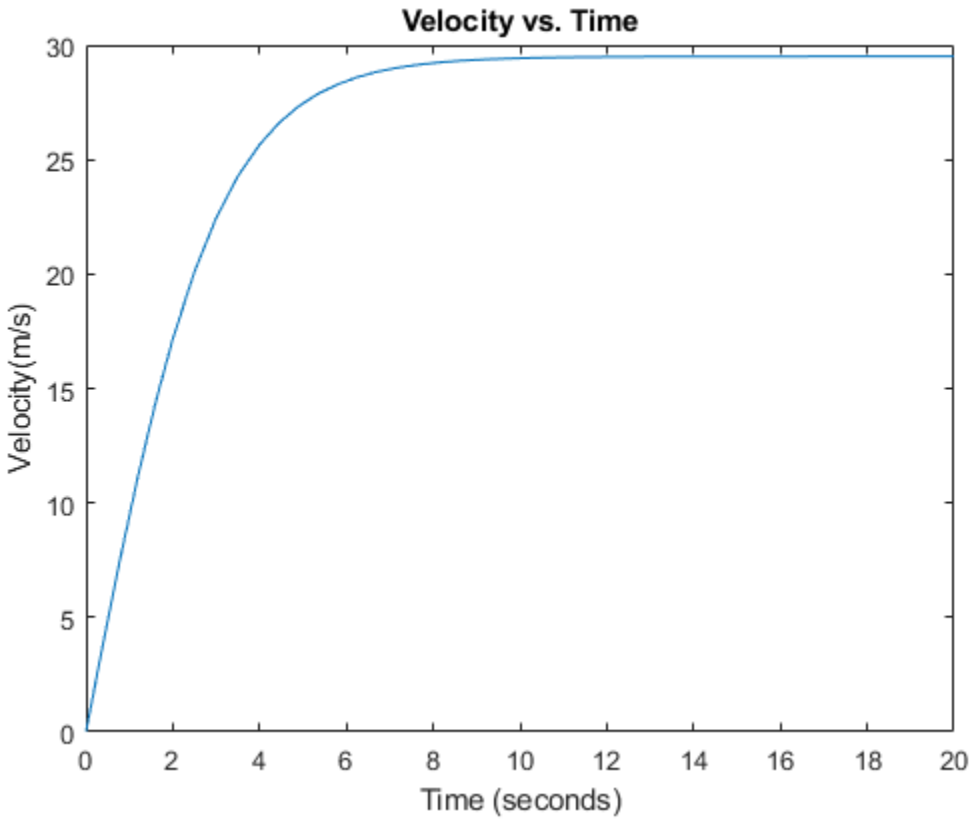
```
m = .3; % [kg]
g = 9.81; % [m/s^2]
rho = 1.225; % [kg/m^3]
Cd = 1.2; % coefficient of drag
A = .0046; % [m^2]
v0 = 0; % [m/s]
v = 0;
```

Propagate with ode45

```
[t,v] = ode45(@(t,v) Accel(t,v, m, g, rho, Cd, A) , [0,20], v0);
```

Plot Velocity vs. Time

```
figure(1);
plot(t,v)
title('Velocity vs. Time');
xlabel('Time (seconds)');
ylabel('Velocity(m/s)');
```



Calculate Kinetic Energy

```
kE = ((1/2)*m).*(v.^2);
```

Plot Kinetic Energy vs. Time

```
figure(2);
plot(t,kE)
title('Kinetic Energy vs. Time');
xlabel('Time (seconds)');
ylabel('Kinetic Energy(J)');
```

```
Unable to resolve the name Accel.m.
```

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