Table of Contents

..... 1
Given 1
Solve 1
Verify Lumped Analysis 1
Run Simulation 1
Plotting 2


```
%%%%%%%%%%%%%%%%%%%%%%%%%
%  ASEN 3113 - 18.19
%  Author: Caleb Bristol
%  Date: 4 April, 2022
%
%%%%%%%%%%%%%%%%%%%%%%%%%

clc
clear
close all;
```

Given

```
L = 0.02; %[m]
k = 21; %[W/mK]
rho = 8000; %[kg/m^3]
c_p = 570; %[J/kgK]
T_i = 18; %[deg C]
T_a = 950; %[deg C]
h = 150; %[W/m^2K]
d = 3; %[m]
v = 0.005:0.001:0.06; %[m/s]
```

Solve

Verify Lumped Analysis

```
    L_c = L/2;

    Bi = h*L_c/k;

    fprintf('Biot Number: \n')
    disp(Bi)
```

```
Biot Number:
    0.0714
```

Run Simulation

```
    b = h/(rho*c_p*L_c);
```

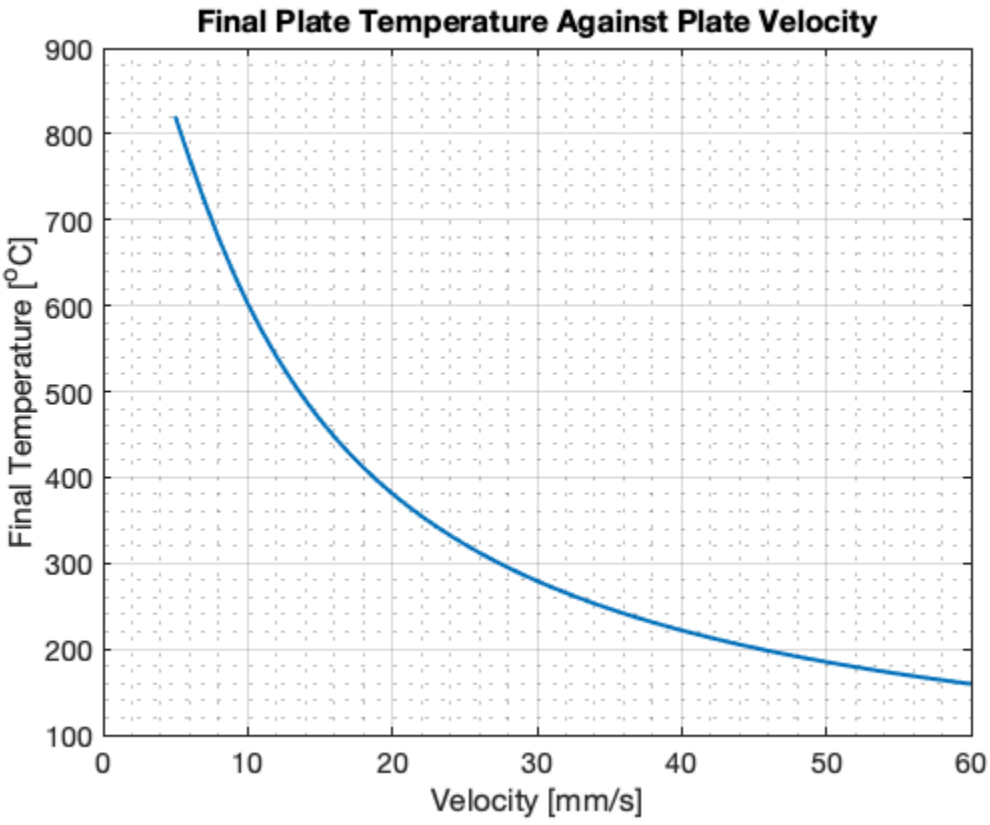
```
t_ = d./v;

T = @(t) T_a + (T_i-T_a).*exp(-(b*t));

T_ = T(t_);
```

Plotting

```
figure()
plot(v.*1000,T_,'LineWidth',2); hold on
xlabel('Velocity [mm/s]')
ylabel('Final Temperature [^oC]')
title('Final Plate Temperature Against Plate Velocity')
set(gca,'Fontsize',14)
grid on; grid minor;
hold off
```



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