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18/Eng02/071

Computer engineering

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computer

1) Initial temp = 10°c T_2 = 20°c @ 5mins
T_{actual} = 25°c
T_A = Actual temperature

$dT/dt \propto (T - T_A)$
$dT/dt = k(T - T_A)$
$\frac{dT}{dt} = k(T - 25)$

collecting like terms

$\frac{dT}{(T-25)} = k\,dt$

Integrating both sides

$\ln(T-25) = tk + c$

$\therefore T - 25 = e^{tk+c}$ where $e^c = A$

$T - 25 = e^{tk} \cdot e^c$

$T - 25 = Ae^{tk}$

$T = Ae^{tk} - 25$

at initial conditions $t = 0$, $T = 10°c$

$10 = Ae^{\circ} - 25$

$A = 35$

$T = 35e^{tk} - 25$

at $T = 20°c$ $t = 5$ mins

$20° = 35e^{5k} - 25$

$e^{5k} = 45/35$

$5k = \ln\left(\frac{45}{35}\right)$

$k = \frac{0.25}{5}$ $k = 0.05$

$T = 35e^{0.05t} - 25$

$T = 24.9$ at $t = ?$

$24.9 = 35e^{0.05t} - 25$

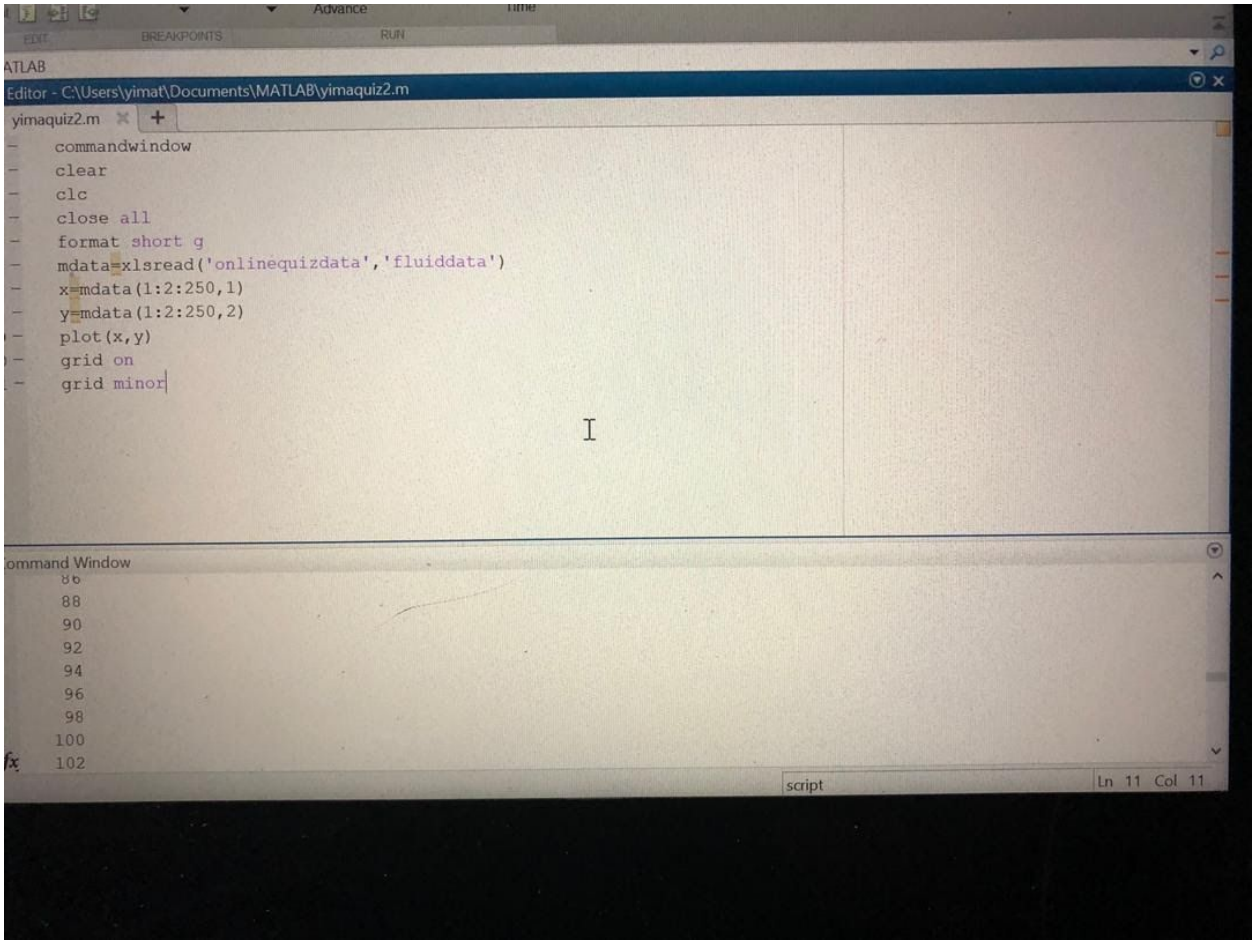
$49.9 = 35e^{0.05t}$

$e^{0.05t} = 49.9/35$

$e^{0.05t} = \ln(1.426)$

$0.05t = 0.355$

$T = 7.1$ minutes


Advance
Time
EDIT
BREAKPOINTS
RUN
ATLAB
Editor - C:\Users\yimat\Documents\MATLAB\yimaquiz2.m
yimaquiz2.m
commandwindow
clear
clc
close all
format short g
mdata=xlsread('onlinequizdata','fluiddata')
x=mdata(1:2:250,1)
y=mdata(1:2:250,2)
plot(x,y)
grid on
grid minor
ommand Window
86
88
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92
94
96
98
100
102
script
Ln 11 Col 11

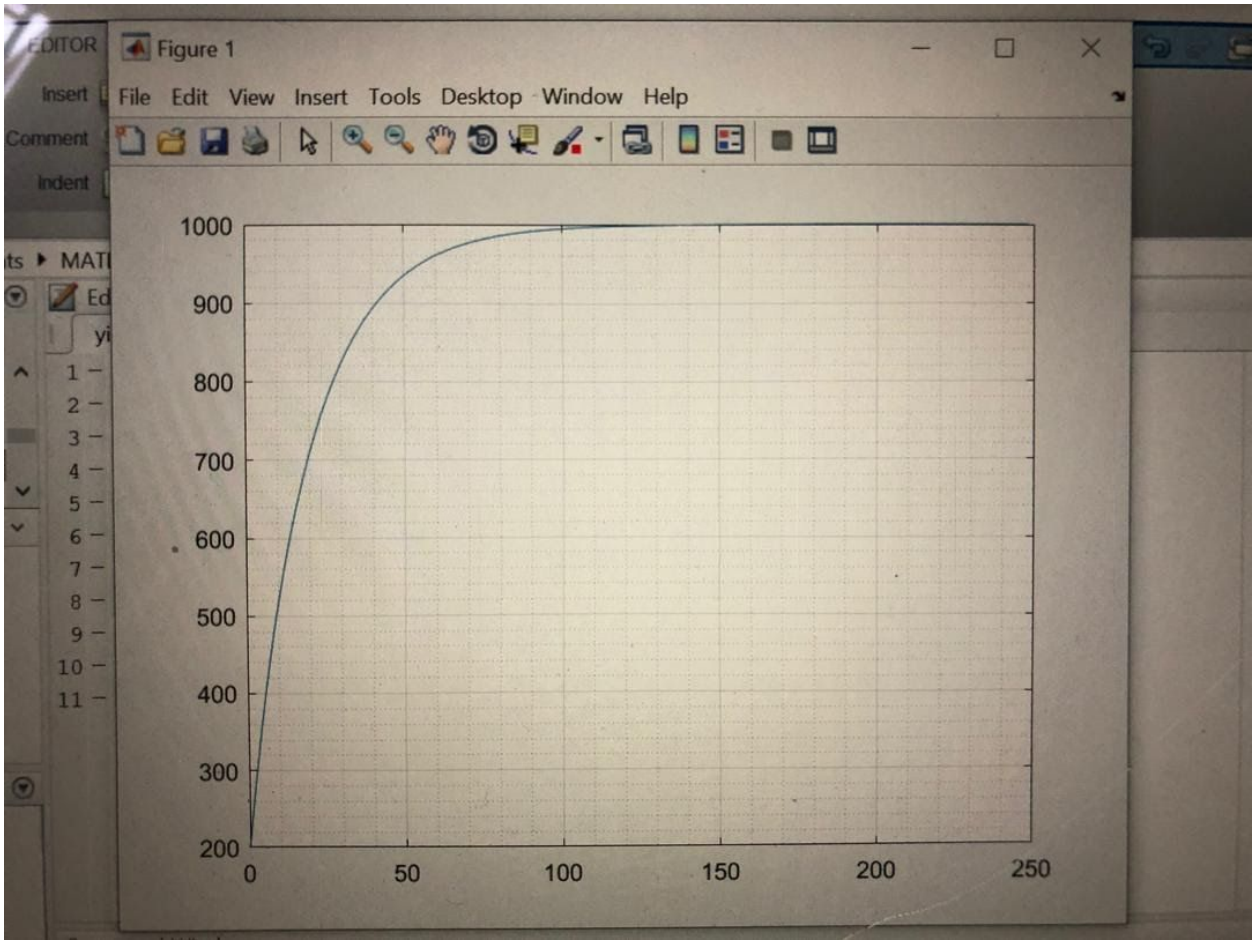
Figure 1
File Edit View Insert Tools Desktop Window Help
1000
900
800
700
600
500
400
300
200
0
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100
150
200
250