EE5351: CONTROL SYSTEM DESIGN

LABORATORY 02

NAME : BANDARA KMTON

REG.NO. : EG/2021/4432

GROUP NO. : CE 07

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Summative Laboratory Form

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| --- | --- |
| Semester | 05 |
| Module Code | EE5351 |
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# OBSERVATIONS

Q1)

1. = ++ 1

= 2

= 3

= 4

1. Considering the above equations Transfer Function Given as:

=

=

Simplified t/f:

=

=

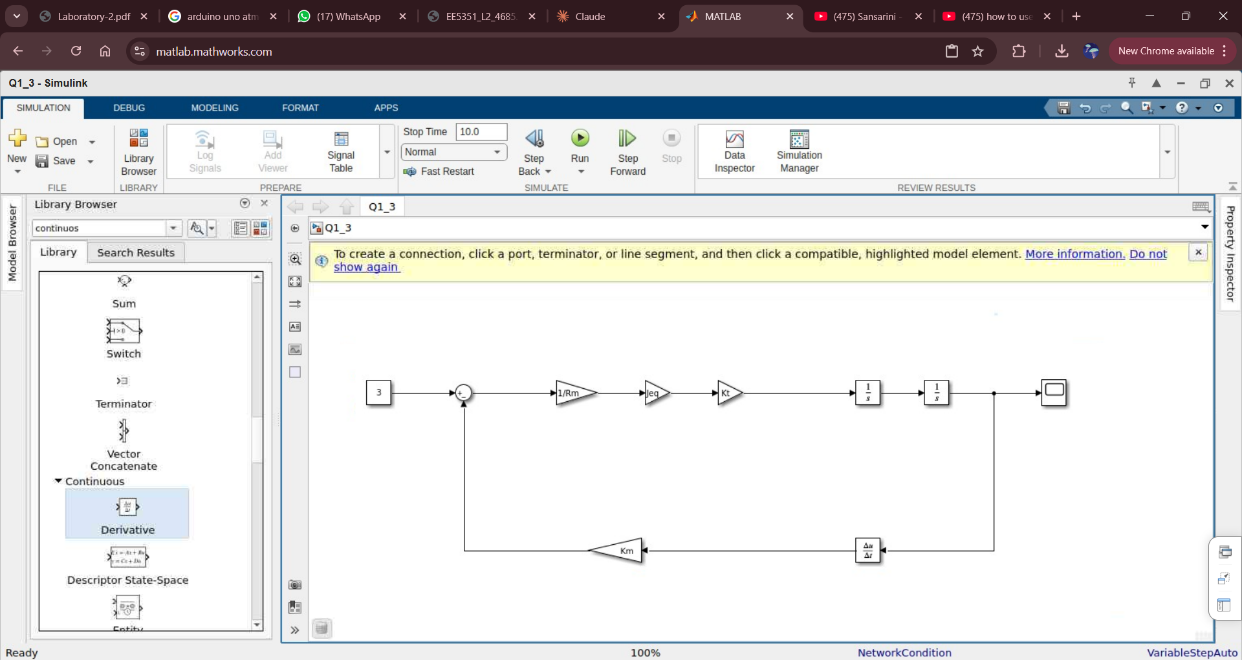
1. 

Figure 1: Simulink for Simplified version

1. This is unity feedback system

=

=

=

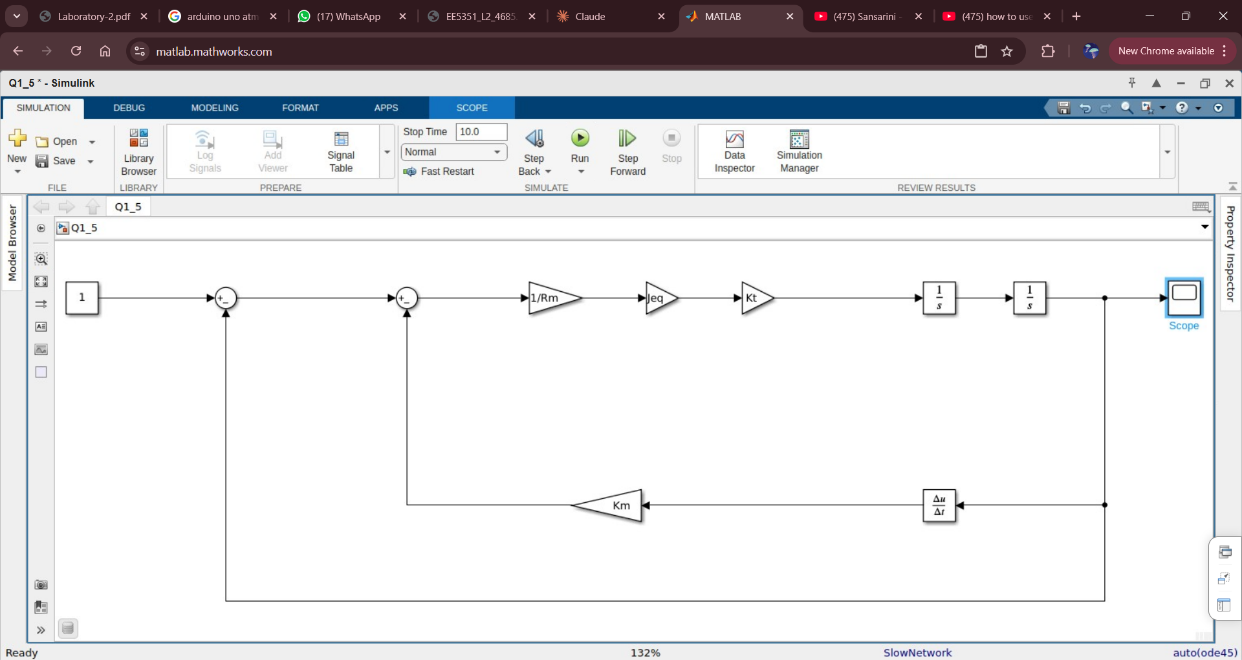


Figure 2: Simulink for the unity feedback system

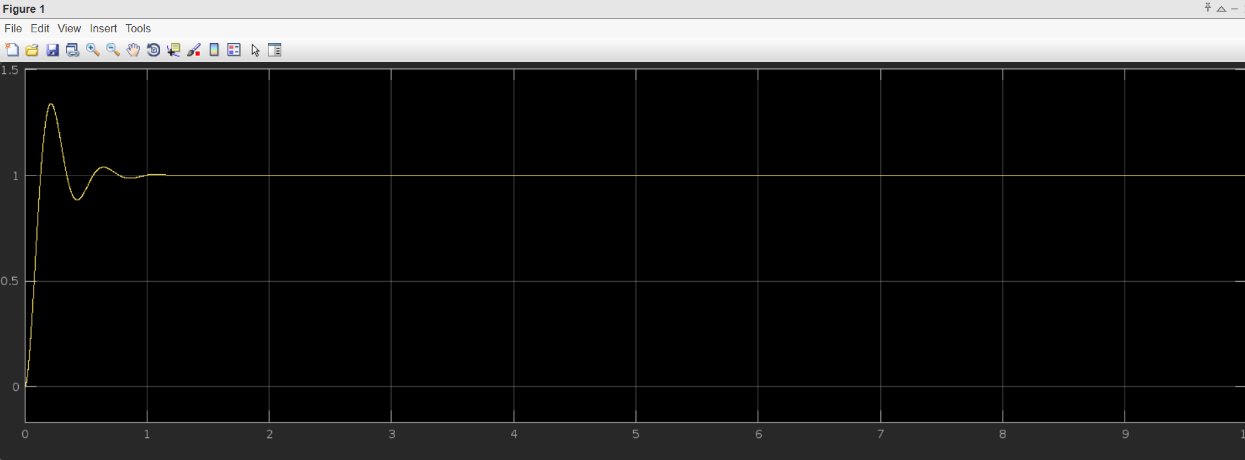


Figure 3:output from the unity feedback system

Overshoot =

= 33.9%

Q2)

=

By considering above t/f the characteristic equation given as follows:

=0

=0

1. For the standard 2nd order system characteristic eqn>>

=0

Thus :

=15.465rad/s

=5.70

=0.325

Overshoot =

=33.97%

1. By reducing overshoot new overshoot is 0.734.60% =23.78%

23.78 =

=0.415

Then

By considering the PD controllers characteristic equation:

=0

Considering Tp <2

>

> 0.01763

By considering as =1

=+

0.325+=0.415

KD  =0.016

Q3)

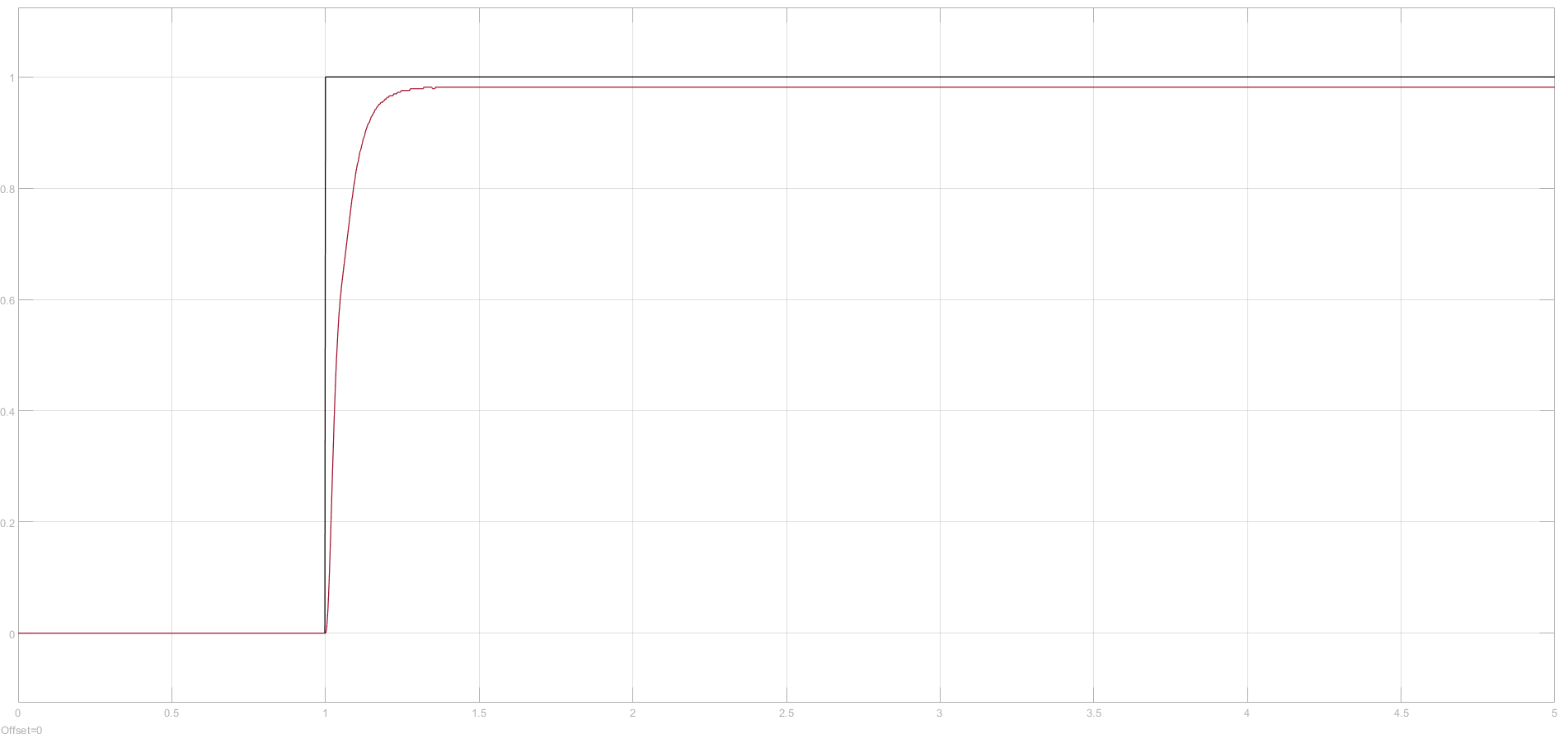
1. 

Figure : Time domain response [**θm(t)]** of the closed loop position control system for an applied **θref(t)** of **1 rad.**

1. Calculated Overshoot:

=

=

A graph with a red line

AI-generated content may be incorrect.

Figure 5: Reducing the overshoot by 30%

A computer screen shot of a computer

AI-generated content may be incorrect.

Figure 6: Design of PD controller

# REFERENCES

|  |  |
| --- | --- |
| [1] | “PD,PI,PID Controllers,” [Online]. Available: https://eng.libretexts.org/Bookshelves/Industrial\_and\_Systems\_Engineering/Introduction\_to\_Control\_Systems\_(Iqbal)/03%3A\_Feedback\_Control\_System\_Models/3.3%3A\_PI\_PD\_and\_PID\_Controllers. |
| [2] | “Tutors Point,” [Online]. Available: https://www.tutorialspoint.com/control\_systems/control\_systems\_controllers.htm. |