EE5351: CONTROL SYSTEM DESIGN

LABORATORY 01

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Summative Laboratory Form

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| --- | --- |
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# OBSERVATIONS

Q1)

1. = ++ 1

= 2

= 3

= 4

1. Considering the above equations Speed Control Given as:

=

=

=

Considering the above equations Position Control Given as:

=

=

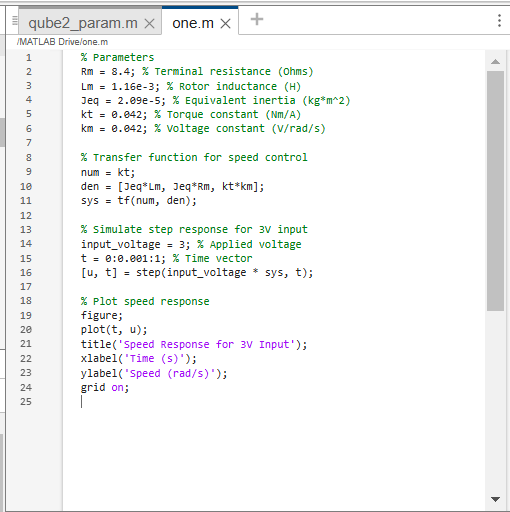
1. 

Figure 1:MathLAB code for the Speed Response

A graph of a speed response

Description automatically generated

Figure 2: Graph For the Speed Response When input Voltage as 3V

A black grid with white lines

Description automatically generated

Figure 3:Simulink for Speed Response

1. Speed Control Given as:

=

=

Position Control Given as:

=

=

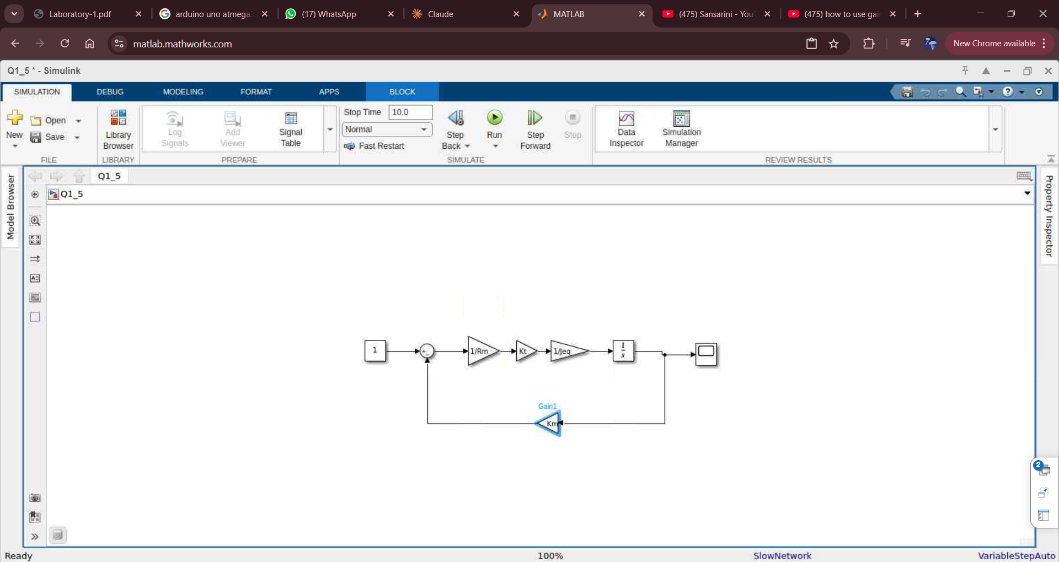


Figure 4: Simulink for simplified version

1. Considering the equations given above:

=

=

= 0

=

= +

=

1. Considering the simplified version

=

=

= 0

=

=

=

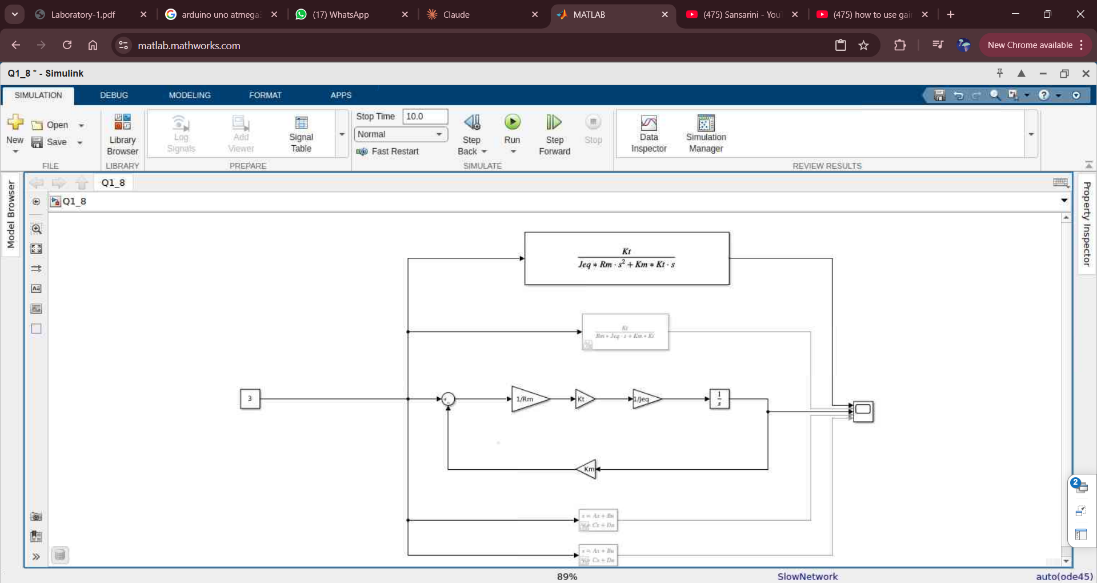
1. 

Figure 5: Combination of the Simulink for 2,4,5,6,7 Questions

Q2)

1. A screen shot of a white screen

   Description automatically generated

Figure 6: Speed Response given by the Model that had created

A screen shot of a white sheet

Description automatically generated

Figure 7: The graph given by state space model and Simulink Model

1. Comparing the graphs there can be error as 10 .

So considering the error the reasons can be achieved by the models value was get by running the rotor so there can be a error that has negligible . not only that but also considering the assumption that the rotor and the modelspace there can be done the errors doing in the the simulate of the equations. As well as when running of the software which can be also happened the errors as can be stucked etc.

Q3)

1. A graph on a white surface

   Description automatically generated

Figure 8: Time Domain Response

Steady State Error: : 0.062

1. When Kp= 1

Steady State Error : : 0.062

Overshoot :

A graph on a white surface

Description automatically generated : 42.32%

Figure 9: Time Domain Response (Kp= 1)

When Kp= 1.25

Steady State Error : : 0.012

Overshoot :

: 35.77%

A screen shot of a graph

Description automatically generated

Figure 10: Time Domain Response (Kp= 1.25)

When Kp= 1.50

Steady State Error : : 0.009

Overshoot :

: 39.246%

A screen shot of a graph

Description automatically generated

Figure 11: Time Domain Response (Kp= 1.50)

When Kp= 1.75

Steady State Error : : 0.039

Overshoot :

: 50.16%

A screen shot of a graph

Description automatically generated

Figure 12: Time Domain Response (Kp= 1.75)

When Kp= 2.00

Steady State Error : : 0.0367

Overshoot :

: 52.18%

A graph on a screen

Description automatically generated

Figure 13: Time Domain Response(Kp= 2.00)

# REFERENCES

|  |  |
| --- | --- |
| [1] | “GREEKFOGGREEK,” [Online]. Available: https://www.geeksforgeeks.org/proportional-controller-in-control-system/. |
| [2] | “Control Tutorials,” [Online]. Available: https://ctms.engin.umich.edu/CTMS/index.php?example=Introduction&section=ControlPID. |