Assignment Web Similarity Analysis

Generated on 2025-03-23 00:31:08

Executive Summary

Overall Web Similarity Score: 50%

Assessment: ```json { "overall_similarity_score": 15, "similarity_assessment": "Low overall similarity. Some matches are due to common phrases in engineering reports and standard MATLAB/Simulink code structures, while others are exact matches to the student's own information (name, ID). A small portion appears to be potentially copied code.", "detailed_matches": [{ "assignment_text": "EE 5351 : CONTROL SYSTEMS DESIGN", "source_url": null, "source_text": null, "similarity"

Conclusion: due to the specific values and code structure, it is inconclusive whether this constitutes plagiarism without seeing more context or similar examples online. The identical parameter values are particularly suspicious. Further investigation is needed to determine if these sections were adapted from online resources or developed independently. Overall, it is likely that the assignment is mostly original work with some potential issues regarding proper attribution for the code components." } ```

Web Sources Analyzed

Source URL	Similarity Score
https://escholarship.org/content/qt7cn177dx/qt7cn177dx_noSplash_4d09c11f5f[illegible].pdf	[illegible]%
https://huggingface.co/datasets/allenai/CoSyn-400K/viewer/chart/train?p=1	21.87%
https://matplotlib.org/3.0.3/Matplotlib.pdf	2.46%
https://dokumen.pub/graphics-and-guis-with-matlab-third-edition-3nbsped-158488[illegible].html	[illegible]%
https://core.ac.uk/download/pdf/43495833.pdf	1.25%

Detailed Content Matches

No specific content matches were identified.

Full Assignment with Highlighted Plagiarism

Sections highlighted in yellow with red text indicate potential plagiarism.

EE 5351 : CONTROL SYSTEMS DESIGN
LABORATORY 01

NAME
REG No

: BALASOORIYA JM
: EG/2021/4424

GROUP No
DATE

: CE 07
: 03/04/2025

Table 1: Summative Laboratory Form
Semester
Module Code
Module Name
Lab Number
Lab Name
Lab Conduction date
Report Submission date

05
EE 5351
Control System Design
01
Laboratory Session-1
05/11/2024
04/03/2024

List of Figures

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CONTENT

01.Observation

Figure 1: QUBEServo3 DC motor and load

Table 2 : QUBEServo3 parameter

Terminal Resistance (Rm)
Rotor inductance(Lm)
Equivalent rotor inertia(Jeq)
Torque constant(kt)

Voltage constant (km)

8.4Ω
1.16 mH
2.09×10-5 kgm2
0.042Nm/A
0.042 Nm/A

02.Calculation
Q1)
i)

Dynamic Equation for DC motor and load

■

= ■ ■ +■

■

= ■ ■

■

=■

■

=■ ■

ii)

Transfer function

ω(s)
■■(■)
ω(s)
■■(■)
ω(s)
■■(■)
■m(s)
■■(■)
■m(s)
■■(■)

+■

■■
{■■■■[■■ + ■■■] + ■■■■}
0.042
=
{2.09 × 10 ■[8.4 + 1.16 × 10 ■] + 0.042 × 0.042
0.042
=
2.424 × 10 × ■ + +17.556 × 10 ■ + 1.764 × 10
=

■■

■{■■■■[■■ + ■■■] + ■■■■}
0.042
=
2.424 × 10 ■ + 1.7556 × 10 ■ + 1.764 × 10 ■
=

iii)
Obtain the domain speed response
MATLAB code

```
% Parameters
Rm = 8.4; % Terminal resistance (Ohms)
Lm = 1.16e-3; % Rotor inductance (H)
Jeq = 2.09e-5; % Equivalent inertia (kg*m^2)
kt = 0.042; % Torque constant (Nm/A)
km = 0.042; % Voltage constant (V/rad/s)
% Transfer function for speed control
num = kt;
den = [Jeq*Lm, Jeq*Rm, kt*km];
sys = tf(num, den);
% Simulate step response for 3V input
input_voltage = 3; % Applied voltage
t = 0:0.001:1; % Time vector
[u, t] = step(input_voltage * sys, t);
figure;
plot(t, u, 'LineWidth', 1.5, 'Color', 'b'); % Improved aesthetics
title('Time domain speed response', 'FontWeight', 'bold');
xlabel('Time (s)', 'FontSize', 12);
ylabel('Speed (rad/s)', 'FontSize', 12);
grid on;
xlim([0, 1]); % Ensure the time axis is within range
ylim([0, max(u) * 1.1]); % Adjust y-axis for better visualization
legend('time domain speed response');
```

Figure 2: Time Domain Response of ■(t)(MATLAB)

Figure 3: Time Domain Response of ■(t)(Simulink)

iv)

Transfer function (negligible rotor inductance)

ω(s)
■■(■)
ω(s)
■■(■)

■
{■ ■ ■ + ■ ■ }
0.042
=
2.09 × 10 × 8.4■ + 0.042 × 0.042
=

■m(s)
■■(■)
■m(s)
■■(■)
v)

■
■{■ ■ ■ + ■ ■ }
0.042
=
1.7556 × 10 ■ + 1.764 × 10 ■
=

Simulink

Figure 4: Simulink Q1(v)

vi)

State Space Model (armature current and rotor speed)

■■■

= –

■
■

■ –

■
■

■ +

■
■

[■]

■
)■ +0×■ +0×■
■
–■
–■
1
■
■
■ ■ ■
■ ■
■
= ■
■ ■ + 0 ■■
■
■
0 ■

■ ■
■
–7241.38 –36.21
.
=
+
2009.57
0
= [0 1]
+[0] ■■

vii)

State Space Model (rotor position and rotor speed)

■■
■
■■

■

=(

= 0×■ ■ +■ +0×■
■ ■■
■
■
= 0×■ –(
)+(
)
■ ■
■ ■
0
1
0
■■
■■
–■
■
= 0
+ ■
■
■■
■■
■ ■
■ ■
■
0
1
=
+

■
■
.
0 –10.05
[■] = [1 0]
+[0] ■
■

■■

viii)

Plot the time domain speed responses

Figure 5: Simulink Q1(VIII)

Q2)
i)

Obtain time response

Figure 6 : Time domain speed response when input voltage 3V
ii)

Compare Results

Figure 7 : Graph of Comparison negligible rotor inductance and applied 3V
Table 3 : Result Comparison
Steady state speed

Based on simplified transfer function

Match with real behavior for 3v input.

Rise time

Determine simplified dynamics(Jeq, Rm, Reflect actual damping and delay present In
kt)to be optimistic.
QUBEServo3.

Settling time

Simplified model response faster
without external disturbances.

Simulink model for actual motor inertia and
damping. It potentially showing longer
settling time

3)

i)

Kp=1

Figure 8 : Graph of steady state error(Kp=1)
ii)

According to the Figure 8,

Overshoot

=

Steady state error

iii)

(

)

=

.

=

1 – 0.938 = 0.062

× 100

× 100 = 33.5%

Kp=1.25

Figure 9 : Graph of steady state error(Kp=1.25)

According to the Figure 9
Steady state error

Overshoot

=

1 – 1.012

=

0.012

=

.

=

37.4%

× 100%

Kp=1.5,

Figure 10 : Graph of steady state error(Kp=1.5)
According to the Figure 10
Overshoot

Steady state error

=

.

=

40.5 %

=

1 – 1.009

=

0.009

× 100

Kp=1.75

Figure 11 : Graph of steady state error(Kp=1.75)
According to the Figure 12
Steady state error

= 1- 0.9603
= 0.0397

Overshoot

=

.

=44.2%

× 100

Kp=2

Figure 12 : Graph of steady state error(Kp=2)
According to the figure
Steady state error

Overshoot

=

1- 0.9633

=

0.0367

=

.

=

46.6%

× 100

03.Reference

[1] MATLAB. [Online]. Available: https://www.mathworks.com/matlabcentral/answers/2000762-how-toconvert-state-space-to-transfer-function.

[2] "Science Direct," [Online]. Available: https://www.sciencedirect.com/topics/engineering/steady-state-error.

[3] "Quanser," [Online]. Available: https://docs.quanser.com/quarc/documentation/qube_servo3_usb.html.

Analysis Methodology

Web Similarity Analysis Method: This report analyzes the similarity between a student assignment and web content using multiple approaches:

1. **Basic similarity analysis** using TF-IDF vectorization and cosine similarity metrics to calculate statistical similarity between texts.

2. **Advanced semantic analysis** using Google's Gemini AI to identify conceptual similarities, common phrases, and potential plagiarism patterns.

3. **Source verification** by analyzing multiple sources to distinguish between common knowledge and unique content.

Interpretation Guide:

• 0-15%: Very low similarity - Likely original content

• 16-30%: Low similarity - Contains common phrases but largely original

• 31-50%: Moderate similarity - May contain some paraphrased content

• 51-70%: High similarity - Contains substantial similar content

• 71-100%: Very high similarity - Significant portions may be unoriginal

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Disclaimer: This automated similarity analysis provides an approximation of content similarity against web sources. Results should be interpreted by a human reviewer for context-appropriate assessment. Common knowledge, standard phrases, and coincidental matches may be flagged and require human judgment.