

Assignment Web Similarity Analysis

Generated on 2025-03-25 15:21:26

Executive Summary

Overall Web Similarity Score: 0%

Assessment: The assignment shows no significant similarity to the provided web sources.

Conclusion: The assignment is likely original work. There are no indications of plagiarism from the provided web sources. The content of the assignment is technical and specific to control systems, while the web sources are either unrelated (PDF document, YouTube video about second-order systems, scientific article on nerve terminals), or contain generic text. The mathematical equations, figures, and tables within the assignment are unique and do not appear in the supplied sources. It's important to note, however, that this analysis is limited by the provided web sources. A more comprehensive plagiarism check against a larger database of academic resources and web content would be needed for a definitive conclusion.

Web Sources Analyzed

Source URL	Similarity Score
https://www.emo.org.tr/ekler/b7e76e55da0d599_ek.pdf?tipi=1&turu=X&sube=6	1.79%
https://www.youtube.com/watch?v=YH4Pj8s9pQU&pp=ygUTI3NIY29uZG9yZGVybmh0Y2Vzmc%3D	0.83%
https://pmc.ncbi.nlm.nih.gov/articles/PMC3326359/	26.54%

Detailed Content Matches

No specific content matches were identified.

Full Assignment with Highlighted Plagiarism

Sections highlighted in yellow with red text indicate potential plagiarism.

EE5351: CONTROL SYSTEM DESIGN

LABORATORY 01

NAME

: BANDARA LRTD

REG No.

: EG/ 2021/ 4433

GROUP NO: CE07

DATE

: 24/01 /2025

Table 1: Summative Laboratory Form

Semester

Module Code

Module Name

Lab Number

Lab Name

Lab conduction date

Report Submission date

05

EE5351

Control System Design

01

Laboratory Section 1

2024.11.05

2025.01.24

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1 OBSERVATION

Table 1: Observations

Terminal Resistance (R_m)

Rotor inductance (L_m)

Equivalent(J_m)

Torque constant (K_t)

Voltage constant (K_m)

8.4

1.16

2.09×10^{-3}

0.042

0.042

Ω

mH

kgm^2

Nm/A

Nm/A

2 CALCULATION

Q1.

i

.

1. Voltage equation:

$$V = R_m i + L_m \frac{di}{dt}$$

$$V = R_m i + L_m \frac{di}{dt}$$

$$+ L_m \frac{di}{dt}$$

$$= V$$

2. Back EMF equation:

$$E_b = K \omega_m$$

3. Torque equation:

$$T = K \omega_m$$

$$E_b = K \omega_m$$

4. Motor torque relationship:

$$T = K \omega_m$$

ii From equations (1), (2), (3), and (4), the speed control transfer function is derived as:

$$\omega(s)$$

$$=$$

$$=$$

$$\omega(s) = \frac{K_t K_f}{s^2 + \left(\frac{R}{L} + \frac{K_b K_f}{L} \right) s + \frac{K_b K_f}{L}}$$

$$\omega(s)$$

$$0.042$$

$$=$$

$$-5$$

$$\omega(s) = \frac{2.09 \times 10^{-3} [8.4 + 1.16 \times 10^{-3} s] + 0.042 \times 0.042}{s^2 + 17.556 s + 2.4244 \times 10^{-3}}$$

$$\omega(s)$$

$$0.042$$

$$=$$

$$-8$$

$$2$$

$$\omega(s) = \frac{2.4244 \times 10^{-3} s + 17.556 \times 10^{-5} s + 1.764 \times 10^{-3}}{s^2 + 17.556 s + 2.4244 \times 10^{-3}}$$

From equations (1), (2), (3), and (4):

$$\theta(s)$$

$$=$$

$$=$$

$$\theta(s) = \frac{K_t K_f}{s^2 + \left(\frac{R}{L} + \frac{K_b K_f}{L} \right) s + \frac{K_b K_f}{L}}$$

$$\theta(s)$$

$$0.042$$

$$=$$

$$\theta(s) = \frac{2.4244 \times 10^{-8} s^3 + 17.556 \times 10^{-5} s^2 + 1.764 \times 10^{-3} s}{s^2 + 17.556 s + 2.4244 \times 10^{-3}}$$

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Figure 1: MathLab code for the Speed Response

Figure 2: Speed Response Get by Mathlab

Figure 3: Speed Response Given by Simulink

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Simplified Equations for Speed Control Transfer Function

$$\omega(s)$$

$$=$$

$$=$$

$$\omega(s) = \frac{K_t K_f}{s^2 + \left(\frac{R}{L} + \frac{K_b K_f}{L} \right) s + \frac{K_b K_f}{L}}$$

$$\omega(s)$$

$$0.042$$

$$=$$

$$\theta(s) \{2.09 \times 10^{-5} \cdot 8.4s + 0.042 \times 0.042\}$$

$$\omega(s)$$

$$0.042$$

$$=$$

$$-4$$

$$\theta(s) \{1.7556 \times 10^{-4} s + 1.764 \times 10^{-3}\}$$

Simplified Equations for Position Control Transfer Function

$$\theta(s)$$

$$\theta(s)$$

$$=$$

$$\theta(s) \{1.7556 \times 10^{-4} s + 1.764 \times 10^{-3}\}$$

$$\theta(s)$$

$$0.042$$

$$=$$

$$\theta(s) \{1.7556 \times 10^{-4} s + 1.764 \times 10^{-3}\}$$

v

vi

From the equations 1, 2, 3, 4;

$$\theta(s)$$

$$\theta(s)$$

$$\theta(s)$$

$$\theta(s) = - () \theta(s) - () \omega(s) +$$

$$\theta(s)$$

$$\theta(s)$$

$$\theta(s)$$

$$\theta(s)$$

$$\omega(s)$$

$$\theta(s) = () \theta(s) + 0 \times \omega(s) + 0 \times \theta(s)$$

eq

■

$$- (\theta(s))$$

■

■

$$[\theta(s)] = [\theta(s)]$$

■

■

$$(\theta(s))$$

■

$$- (\theta(s))$$

eq

■

$$-7241.38$$

$$[\theta(s)] = [\theta(s)]$$

■ ■

■

2009.57

■

0

1

■

][■] + [■ ■] ■ ■

■ ■

0

−36.21 ■ ■

862.07

][] + [

] ■ ■

■

0

0

■

vii

From the simplified equations

$$\theta_{11} = 0 \cdot \theta_1 + \omega_1 + 0 \cdot \theta_{11}$$

■ ■ ■ ■

■ ■

ω_1

$$\theta_1 = 0 \cdot \theta_1 - ($$

$$) \omega_1 + ($$

$$) \theta_1$$

$$\theta_{11} \theta_{11} \text{eq}$$

$$\theta_{11} \text{eq} \theta_{11} \theta_{11}$$

0

■ ■ ■

$$[] = [0$$

■ ■

■

1

0

■ ■

■

$$- (\theta_{11} \theta_{11}) [\theta_{11}] + [(\theta_{11} \theta_{11})] \theta_{11}$$

■ ■ ■ ■

$$\theta_{11} \text{eq}$$

$$\text{eq} \theta_{11}$$

■
 ■■
 0
 1
 0
 $[\blacksquare] = [$
 $][\blacksquare] + [$
 $] \blacksquare$
 ■
 0 – 10.05
 239.23 ■
 ■■
 ■
 ■

Q2.

Figure 4: Speed Response in the Model

Figure 5: Comparing of the Speed Response with Model and State Vector

2. According to my knowledge I think the basic thing for happening those kind of the error is negligence of the resistance where having in the rotor and also matlab is the software which required the best performance of the computers so considering the computers which has been used there can be errors as the performance.

Q3)

1.

Figure 6: The Speed Response when $K_P=1$

2.

Steady State Error:

Overshoot =

$1 - 0.938$

$1.335 - 0.938$

0.938

$= 42.324\%$

$\times 100\%$

:

0.062

3.

Figure 7: Speed Response from Simulink when $K_P=1.25$

According to the Figure 5 when $K_p = 1.25$,

Steady state error = $1 - 1.012 = 0.012$

Overshoot =

$$1.374 - 1.012$$

$$1.012$$

$$\times 100\%$$

$$= 35.770\%$$

.

Figure 8: Speed Response from Simulink when $K_P=1.50$

According to the Figure 6 when $K_p = 1.5$,

Steady state error = $1 - 1.009 = 0.009$

Overshoot =

$$1.405 - 1.009$$

$$1.009$$

$$= 39.25\%$$

$$\times 100\%$$

Figure 9: Speed Response from Simulink when $K_P=1.75$

According to the Figure 7 when $K_p = 1.75$,

Steady state error = $1 - 0.96$

=

$$0.04$$

Overshoot =

$$1.442 - 0.9603$$

$$0.9603$$

$$\times 100\%$$

$$= 50.161\%$$

Figure 10: Speed Response from Simulink when $K_P=2.0$

According to the Figure 8 when $K_p = 2$,

Steady state error = 3.35×10^{-2}

Overshoot =

$$1.466 - 0.9633$$

$$0.9633$$

$$= 52.19\%$$

$$\times 100\%$$

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

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.