Assignment Web Similarity Analysis

Generated on 2025-03-22 00:43:54

Executive Summary

Overall Web Similarity Score: 30%

Assessment: The assignment shows some similarity to online resources related to step response analysis and control systems, but the majority of the content appears to be derived from the student's own calculations and MATLAB code. The similarity is primarily focused on general concepts and terminology related to step response analysis, which are common in control systems education.

Conclusion: While the assignment uses common terminology related to step response and control systems, and even has an exact match to a YouTube video title, the core content, such as the derivations, calculations, MATLAB code, and specific parameter values related to the DC motor model, appears original. The matches are generally related to common phrases used in control systems engineering or generic titles of educational resources. Thus, the assignment is unlikely to be considered plagiarized. However, it would be beneficial for the student to explicitly cite any resources they consulted for background information or conceptual understanding, even if they didn't directly copy text.

Web Sources Analyzed

Source URL	Similarity Score
https://www.chegg.com/homework-help/questions-and-answers/following-figures-show-block-diagram-step-respons	52.48%
https://www.youtube.com/watch?v=virn3Nnwb3A	5.38%
https://www.chegg.com/homework-help/questions-and-answers/2-figure-3-shows-step-response-curve-system-1-syst	16.68%
https://www.youtube.com/watch?v=_g-lzZ5e0h0	6.52%

Detailed Content Matches

Match 1 - Similar Content (70%)

Assignment: Step Response of the system

Source: https://www.chegg.com/homework-help/questions-and-answers/following-figures-show-block-diagram-step-response-system-r-s-y-s-10k-figure-3-step-respon-q51329205

Source Text: Step Response

Match 2 - Similar Content (70%)

Assignment: Step Response of the system

Source: https://www.chegg.com/homework-help/questions-and-answers/2-figure-3-shows-step-response-curve-system-1-system-curve-represents-plcase-explain-2-als-q127731696

Source Text: step response curve of a system

Match 3 - Similar Content (90%)

Assignment: Step Response of the system

Source: https://www.youtube.com/watch?v=virn3Nnwb3A

Source Text: Step Response of a System

Match 4 - Exact Match (100%)

Assignment: Step Response of a transfer function

Source: https://www.youtube.com/watch?v=_g-lzZ5e0h0

Source Text: Step Response of a transfer function

Match 5 - Common Knowledge (100%)

Assignment: steady-state value

Source: https://www.chegg.com/homework-help/questions-and-answers/2-figure-3-shows-step-response-curve-system-1-system-curve-represents-plcase-explain-2-als-q127731696

Source Text: steady state value

Match 6 - Similar Content (50%)

Assignment: The steady-state value of the step response :

Source: https://www.chegg.com/homework-help/questions-and-answers/following-figures-show-block-diagram-step-response-system-r-s-y-s-10k-figure-3-step-respon-q51329205

Source Text: Figure 3 Step Response

Full Assignment with Highlighted Plagiarism

Sections highlighted in yellow with red text indicate potential plagiarism.

EE5351:CONTROL SYSTEM DESIGN
ASSIGNMENT 03

NAME

:

BANDARA LRTD

REG.NO

:

EG/2021/4433

SEMESTER:

05

DATE

04/11/2024

:

Tables of Figures

Q1)

Figure 1: Sample DCMotor

Sample Data Set
Voltage constant of the motor (kb)

-

0.85V/rads-1

Torque constant of the motor (km)

-

0.9 Nm/A

Tachometer constant (kt)

-

0.15 V/rads-1

Inertia of the rotating parts of the motor (J)

-

0.85kgm2

Input DC voltage (Vi(t))

-

10.0V

Voltage gain of the amplifier (A)

-

100

Armature resistance and inductance

-1.3 Ω, 0.5 H respectively

1. Assume that Gm as the transfer function of DC motor. Then assume the armechure current as Ia
■■

Va (t) = IaRa+L■■+V0
V0
Tm

= kb■m

= kmIa

Now convert the time equations into the laplase domain
Va (s) = IaRa+LSI+ V0
V0
= kb■m
Tm
= kmIa
Tm
= J■m
Gm

■■
2+■■■■+■ ■
■ ■
■■■

=

Assume the overall transfer function as Gs
Gs

■■

■
=1+■ ■■

■

■

■■

=■■ ■2+■ ■ ■+■■■■ +■ ■

■

■

■

■

■ ■

By subsituing values

Gs

100×0.9

=0.85×0.5■2+0.85×1.3■+0.9×(0.85+100×0.015)

90

=0.425■2 +1.1■+2.11

2. Sample code

```
% Define the transfer function numerator and denominator
numerator = 90;
denominator = [0.425, 1.105, 2.115];
% Create transfer function
G = tf(numerator, denominator);
poles = pole(G); %Find poles
zeros = zero(G); %Find zeros
%Display poles and zeros
disp('Poles:');
disp(poles);
disp('Zeros:');
disp(zeros);
% Plot the poles and zeros in the s-plane
pzmap(G);
title('Pole-Zero Plot');
grid on;
```

output

```
>> Q1_2
Poles:
-1.3000 + 1.8129i
-1.3000 - 1.8129i
Zeros:
>>
```

Figure 2:Pole zero plot of Splane

3. Sample code

```
% Define the transfer function numerator and denominator
```

```
numerator = 900;
denominator = [0.425, 1.105, 2.115];
% Create the transfer function
G = tf(numerator, denominator);
% Define the time vector
t = 0:0.01:10; % time vector from 0 to 10 seconds with a step of 0.01
% step response
[y, t] = step(G, t);
% Plot the step response
step(G, t);
grid on;
title('Step Response of the System');
% Calculate and display the steady-state value
```

Source: https://www.chegg.com/homework-help/questions-and-answers/2-figure-3-shows-step-response-curve-system-1-system-curve-represents-plcase-explain-2-als-q127731696

```
steady_state_value = y(end);
disp(['The steady-state value of the step response : ', num2str(steady_state_value)]);
```

Source: https://www.chegg.com/homework-help/questions-and-answers/2-figure-3-shows-step-response-curve-system-1-system-curve-represents-plcase-explain-2-als-q127731696

output

```
>> Q1_3
The steady-state value of the step response : 425.5316
```

Source: https://www.chegg.com/homework-help/questions-and-answers/2-figure-3-shows-step-response-curve-system-1-system-curve-represents-plcase-explain-2-als-q127731696

Figure 3:Step Response of the system

Source: https://www.youtube.com/watch?v=virn3Nnwb3A

4. Considering the transfer function we can simplify it as follows.

211.756

Gs

=■2 +2.6■+4.976

So it shows that the characteristic equation as :

■ 2 + 2.6■ + 4.976 =0

■■ 2 =4.976

■■ =2.23

2■■■ =2.6

=0.583

■

–■■

Mp =■ √1–■

= 0.105

So it can be taken the o/p as follows

■(s)

=G(s)xV(s)

90

10

=0.425■2 +1.1■+2.11x ■
900

=■(0.425■2+1.1■+2.11)

For that the sample mathlab code
% Define the transfer function numerator adn denominator
numerator = 900;
denominator = [0.425 1.105 2.115 0]; % Multiply by s

% Using residue to find the partial fraction expansion
[residues, poles, direct_terms] = residue(numerator, denominator);

% Display the results
disp('Residues:');
disp(residues);
disp('Poles:');
disp(poles);
disp('Direct Terms:');
disp(direct_terms);

from that it given the o/p as
>> Q1_4
Residues:
1.0e+02 *

-2.1277 + 1.5257i
-2.1277 - 1.5257i
4.2553 + 0.0000i

Poles:
-1.3000 + 1.8129i
-1.3000 - 1.8129i
0.0000 + 0.0000i

•

■s

=[
=[

4.2553
■
4.2553
■

–2.1277+1.5257■

–2.1277–1.5257■

+ ■+1.3–1.8129■ + ■+1.3■+1.8129■] × 102
4.26■+11.034

– ■2 +2.6■+4.976] × 102

From inverse laplase domain

•

■t

=[4.2553■(■) – 4.26■ –1.3■ cos(1.813■) – 3.03■ –1.3■ sin■(1.813■)] × 102

to find the ■ss it can be used final value theorem because all the poles are located in the left half of the s plane.

■ss

=lim [[4.2553■(■) – 4.26■ –1.3■ cos(1.813■) – 3.03■ –1.3■ sin■(1.813■)] × 102]

■→∞

=425.53rad■ –1

So the overshoot equation is given as

Mp

■

■

–■■

–■■■

= ■■

■

; Mp =■ √1–■ = 0.105

■■

–4.2553×102

0.105 = ■■

4.2553×102

■■■

5. TP

=4.702× 102 rad■ –1

=

■

■×√1–■ 2

■

=

2.23×√1–0.5832

=1.73s

6.

Figure 4:Figure of the Simulink system

7.

Figure 5:Final Output

8. By looking at the figure2 it is clear that ll the poles are located in the left hand side. Thus it is clear that the system is stable.

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.