

# Assignment Web Similarity Analysis

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## Executive Summary

Overall Web Similarity Score: 10%

**Assessment:** Low overall similarity. The assignment primarily contains code and equations related to control systems, which are not present in the provided web source (a PDF of lecture notes that appears to be encoded binary data, likely the raw file content rather than the text). Some standard terminology related to control systems and root locus analysis might be present in both, but these fall under common engineering knowledge. The assignment's structure (lab report format) is also dissimilar to the provided web source.

**Conclusion:** The assignment demonstrates original work. The presence of common engineering terms does not indicate plagiarism. The provided web source does not contain content that matches the specific equations, code, or analysis present in the assignment. It is important to note that only one web source was provided for comparison, and a more thorough analysis would require checking against a broader range of potential sources (including textbooks, lecture slides from the student's course, and other online resources) to definitively rule out plagiarism. Furthermore, the supplied PDF content seems to be raw binary data which prevents a proper comparison.

## Web Sources Analyzed

Source URL	Similarity Score
https://ocw.mit.edu/courses/2-003-modeling-dynamics-and-control-i-spring-2005/lectures/lec3.pdf	5.1441836e-06

## Detailed Content Matches

### Match 1 - Common Knowledge (100%)

**Assignment:** Root Locus  
**Source:** None  
**Source Text:** None

### Match 2 - Common Knowledge (100%)

**Assignment:** transfer function  
**Source:** None  
**Source Text:** None

### Match 3 - Common Knowledge (100%)

**Assignment:** natural frequency  
**Source:** None  
**Source Text:** None

# Full Assignment with Highlighted Plagiarism

Sections highlighted in yellow with red text indicate potential plagiarism.

EE5351: CONTROL SYSTEM DESIGN

LABORATORY 03

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REG.NO. : EG/2021/4432

GROUP NO. : CE 07

DATE : 20/01/2024

Summative Laboratory Form

Semester

05

Module Code

EE5351

Module Name

Control Systems Design

Lab Number

03

Lab Name

Laboratory Session 3

Lab Conducted Date

2024.11.05

Report Submission Date

2025.01.24

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Source: None

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Source: None

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OBSERVATIONS

Question1)

= ++ 1

= 2

= 3

= 4

Considering the above equations t/f Given as:

=

By neglecting the rotor inductance (Due to the Small value)

=

=

Figure 1: Simulink for the Question 3

Figure 1: Simulink for the Question 3

To get the closed loop **transfer function**

Source: None

=

=

Figure 2: Simulink for updated version from Q3

Figure 2: Simulink for updated version from Q3

Figure 3: Time domain response for Q5

Figure 3: Time domain response for Q5

Question2)

Figure 4: Code for Root locus of closed loop

Figure 4: Code for Root locus of closed loop

Figure 5: **Root Locus**

Source: None

Figure 5: **Root Locus**

Source: None

By considering the characteristic equation

2 =

= 10.045

clc; clear; close all;

%% Define the Open-Loop Transfer Function for DC Motor Position Control

numerator = [0.042]; % System gain

denominator = [17.556e-5, 1.764e-3, 0.042]; % Denominator coefficients

G = tf(numerator, denominator);

%% Plot the **Root Locus** of the Open-Loop System

Source: None

figure;

rlocus(G);

title('Root Locus of DC Motor Position Control System');

Source: None

grid on;

%% Increase Natural Frequency by 10%

omega\_n = 10.045; % Current **natural frequency** (example value)

Source: None

```
omega_n_new = 1.1 * omega_n; % New desired natural frequency (increase by 10%)
```

Source: None

```
% Now, we will modify the system to achieve the new natural frequency.
```

Source: None

```
% We need to adjust the parameters of the system such that the new  $\omega_n$  is achieved.
```

```
% Adjust the denominator to increase  $\omega_n$  by 10%
```

```
denominator_new = denominator;
```

```
denominator_new(1) = denominator_new(1) * (omega_n_new / omega_n); % Adjust the first denominator term to scale with  $\omega_n$ 
```

```
% Create the new transfer function
```

Source: None

```
G_new = tf(numerator, denominator_new);
```

```
%% Plot the Root Locus of the Modified System
```

Source: None

```
figure;
```

```
rlocus(G_new);
```

```
title('Root Locus After Increasing Natural Frequency by 10%');
```

Source: None

```
grid on;
```

Figure 6: Root Locus after increasing Omega

Source: None

Figure 6: Root Locus after increasing Omega

Source: None

```
clc; clear; close all;
```

```
%% Define the Open-Loop Transfer Function for DC Motor Position Control
```

```
numerator = [0.042]; % System gain
```

```
denominator = [17.556e-5, 1.764e-3, 0.042]; % Denominator coefficients
```

```
G = tf(numerator, denominator);
```

```
%% Plot the Root Locus of the Open-Loop System
```

Source: None

```
figure;
```

```
rlocus(G);
```

```
title('Root Locus of DC Motor Position Control System');
```

Source: None

```
grid on;
```

```
%% Increase Natural Frequency by 10%
```

```
omega_n = 10.045; % Current natural frequency (example value)
```

Source: None

```
omega_n_new = 1.1 * omega_n; % New desired natural frequency (increase by 10%)
```

Source: None

```
% Now, we will modify the system to achieve the new natural frequency.
```

Source: None

```
% We need to adjust the parameters of the system such that the new  $\omega_n$  is achieved.
```

```
% Adjust the denominator to increase  $\omega_n$  by 10%
```

```
denominator_new = denominator;
```

```
denominator_new(1) = denominator_new(1) * (omega_n_new / omega_n); % Adjust the first denominator term to scale with  $\omega_n$ 
```

```
% Create the new transfer function
```

Source: None

```

G_new = tf(numerator, denominator_new);
%% Plot the Root Locus of the Modified System
Source: None
figure;
rlocus(G_new);
title('Root Locus After Increasing Natural Frequency by 10%');
Source: None
grid on;
% Calculate and plot the time response of both systems
figure;
step(G, 'b', G_new, 'r'); % Original in blue, Modified in red
title('Comparison of Time Responses: Original vs Modified System');
legend('Original System', 'Modified System');
grid on;

```

Figure 7: Comparison of the time responses

Figure 7: Comparison of the time responses

Question3)

Figure 8: Designing Compensator

Figure 8: Designing Compensator1.

2.

Figure 9: Time domain response  $[\theta_m(t)]$  of the closed loop position control system of DC motor

Figure 9: Time domain response  $[\theta_m(t)]$  of the closed loop position control system of DC motor

References

[1]

"Tutorials Point," [Online]. Available: [https://www.tutorialspoint.com/control\\_systems/control\\_systems\\_construction\\_root\\_locus.htm](https://www.tutorialspoint.com/control_systems/control_systems_construction_root_locus.htm).

[2]

"Mathworks," [Online]. Available: <https://in.mathworks.com/help/control/ref/dynamicsystem.rlocus.html>.

[3]

[Online]. Available: <https://www.geeksforgeeks.org/control-systems-controllers/>.

# Analysis Methodology

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**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.*