

Daffodil International University

Dept. of Electrical and Electronic Engineering (SPRING 26)

Quiz: 2

Course Code: 0541-121 Course Title: Linear Algebra and Complex Variable

Section: F

Time: 30 minutes

Set-1

Marks: 15

1. $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ is given by $T(x, y, z) = (x - 2y + 4z, 2x - 4y - z, y + z)$

Check whether T is a linear mapping and find T^{-1} if it exists.

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2. In a power distribution network, voltage readings are taken from four different transmission lines. These readings are represented as vectors:

$$V_1 = (1, 2, 1, 1), V_2 = (2, -1, 2, 0), V_3 = (3, 1, 3, 1), V_4 = (1, 0, 1, 1)$$

A new voltage reading is observed at another point in the network: $V = (7, 2, 7, 3)$. Determine whether V can be expressed as a linear combination of V_1, V_2 and V_3, V_4 .

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3. Discuss about linear independence of vectors.

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Quiz: 3

Course Code: 0541-121 Course Title: Linear Algebra and Complex Variable

Section: L1T2-F

Time: 30 minutes

SET- 2

Marks: 15

1. If matrix $A = \begin{bmatrix} -3 & 1 & -1 \\ -7 & 5 & -1 \\ -6 & 6 & -2 \end{bmatrix} \begin{bmatrix} 1 & -3 & 3 \\ 3 & -5 & 3 \\ 6 & -6 & 4 \end{bmatrix}$

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i. Find a spectrum of A.

ii. Find eigenvalues of A^T, A^3, A^{-1}, A^{-3} .

iii. Find A^{-1} by using Cayley-Hamilton Theorem.

2. Find the fifth root of $-1 - 2i$.

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3. Express $\frac{(1+2i)^2}{(2+i)^2}$ to the form $A + iB$.

$$\frac{(2+i)^5}{(3-i)^5}$$

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Quiz: 4/ missed quiz

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Time: 30 minutes

Marks: 15

1. Evaluate the following

3 * 3 = 9

i. $\oint_C \frac{e^{2z} \cos z}{\left(z - \frac{\pi}{3}\right)^3} dz$ where C is the circle $|z| = 2$

ii. $\oint_C \frac{\sin \pi z^2 + \cos \pi z^2}{(z-2)(z-1)} dz$ where C is the circle $|z-1| = 4$

iii. $\oint_C \frac{e^z}{(z-2)} dz$ where C is a) the circle $|z| = 3$, b) the circle $|z| = 1$

2. Find all the fifth root of $\frac{(2-i)^2(1+i)^2}{(3+i)^2(1-i)^2}$ and locate these points in a complex plane.

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