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Unit 9 - Week 7

Assignment 7 - Objective

The due date for submitting this assignment has passed. Due on 2020-04-15, 23:59 IST.
As per our records you have not submitted this assignment.

1) State whether True or False. ***1 point***

Let A be an $n \times n$ real matrix diagonalizable over $\mathbb{R}$ and B be an $n \times n$ real matrix such that $B = U^{-1}AU$, for some invertible $n \times n$ real matrix U. Then B is diagonalizable.

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

2) Let A be an $n \times n$ real matrix which is diagonalizable over $\mathbb{R}$. Let $P(t) = a_0 + a_1 t + \cdots + a_k t^k$ be a polynomial function with $a_0, \ldots, a_k \in \mathbb{R}$ such that $P(s) < P(t)$, whenever $s < t$ in $\mathbb{R}$. Let $\lambda_1, \ldots, \lambda_m$ be the distinct eigenvalues of A. Then ***1 point***

- The matrix $P(A)$ is diagonalizable over $\mathbb{R}$ with distinct eigenvalues $P(\lambda_1), \ldots, P(\lambda_m)$, and the algebraic multiplicity of each λ_i is equal to the geometric multiplicity of $P(\lambda_i)$.
- The matrix $P(A)$ is diagonalizable over $\mathbb{R}$ if and only if $\deg P \leq 1$.
- The matrix $P(A)$ is diagonalizable over $\mathbb{R}$, but the distinct eigenvalues of $P(A)$ need not be $P(\lambda_1), \ldots, P(\lambda_m)$.
- The matrix $P(A)$ need not be diagonalizable over $\mathbb{R}$.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The matrix $P(A)$ is diagonalizable over $\mathbb{R}$ with distinct eigenvalues $P(\lambda_1), \ldots, P(\lambda_m)$, and the algebrai multiplicity of each λ_i is equal to the geometric multiplicity of $P(\lambda_i)$.

3) State whether True or False. ***1 point***

Let A, B be two $n \times n$ real matrices which are diagonalizable over $\mathbb{R}$ such that they have the same set of distinct eigenvalues with the same set of corresponding algebraic multiplicities, that is, each eigenvalue has the same algebraic multiplicity as an eigenvalue of A and as an eigenvalue of B. Then there exists an invertible $n \times n$ real matrix U such that $B = U^{-1}AU$.

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

4) State whether True of False. ***1 point***

There is no nonzero 3×3 real matrix A which is diagonalizable over $\mathbb{R}$ such that $\det A = 0$.

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False