[Week 7] Quiz 2

Started: Mar 1 at 1:11pm

Quiz Instructions

This Quiz is in a multiple-choice or fill-in-the-blank format.

You only have one attempt for this quiz.

Please, take your time to answer the questions.

Question 1 4 pts

Consider the matrix $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ and the vector $b = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$.

The size of A is [2] x [2] , and the size of b is [2] x [1] .

The determinant of the matrix A is [1] . Consequently, A is called [invertible or non-sir] .

We can multiply A and b, because their [A's column and b's] dimensions coincide.

The resulting product is a [matrix] of size [2] x [1] .

We can also compute $b^T A$, and the result will be a [matrix] of size [1] x [2]

Question 2 2 pts

Consider the system of algebraic equations $A\,x = b$, where $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ and $b = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$.

Check all that apply.

- [ ] The system has infinitely many solutions
- [ ] The system has a unique solution, i.e., the null vector
- [x] The system has a unique solution, i.e.,$A^{-1}b$
- [ ] The system has no solution
- [x] Since the matrix is non-singular, the system has a unique solution
- [ ] Since the matrix is singular, the system has no solution
- [ ] Since the matrix is singular, the system has a unique solution

- [ ] Since the matrix is non-singular, the system has infinitely many solutions

- [ ] Since the matrix is non-singular, the system has no solution

Question 3 5 pts

Consider the system of algebraic equations $A\,x = b$, where $A = \begin{bmatrix} 1 & 2 \\ 1 & 1 \\ \frac{1}{4} & \frac{1}{2} \end{bmatrix}$ and the vectors

$b_1 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 4 \\ 1 \end{bmatrix}$.

Check all that apply.

- [ ] A is non-singular

- [x] A is singular

- [x] The determination of A is zero

- [ ] The determinant of A is nonzero

- [ ] $Ax = b_1$ has a unique solution

- [x] $Ax = b_1$ has no solution

- [ ] $Ax = b_1$ has infinitely many solutions

- [ ] $Ax = b_2$ has a unique solution

- [ ] $Ax = b_2$ has no solution

- [x] $Ax = b_2$ has infinitely many solutions
- [x] $Ax = \mathbf{0}$ has a unique solution
- [ ] $Ax = \mathbf{0}$ has no solution
- [ ] $Ax = \mathbf{0}$ has infinitely many solutions

Question 4 5 pts

Consider the matrix $A = \begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}$.

- [x] The eigenvalues of A are the main diagonal entries for this particular matrix
- [ ] The eigenvalues of A are the main diagonal entries for any matrix
- [x] The eigenvalues of A are 1 and 2
- [ ] The eigenvalues of A are 1 and 3
- [ ] The eigenvectors of A are (-1,3) and (0,-1)
- [ ] The eigenvectors of A are (1,3) and (0,1)
- [ ] The eigenvectors of A are (-1,3) and (1,0)
- [ ] The eigenvectors of A are (-1,3) and (0,1)
- [ ] The eigenvectors of A are (-1/3,1) and (0,15)

- [ ] The eigenvectors of A are (0,0) and (0,1)
- [x] The eigenvectors of A are vectors on the lines 3x+y=0 and x=0
- [ ] The eigenvectors of A are vectors on the lines 3x+2y=0 and x=0
- [ ] No answer text provided.

Question 5 9 pts

Given the matrix $A = \begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix}$,

the eigenvalues are [eig1: 2, eig2: 4] (smaller eigenvalue first and use notation: eig1,eig2)

The eigenvectors are respectively [(1, -1); (1, 1)] (keep the order and use following notation: (v1,v2); (w1,w2))

Quiz saved at 1:36pm Submit Quiz