**LAFDS Session 3&4 Homework**

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**Group No.: 2**

**Lecturer Name: \_\_\_\_\_\_**

**Submission date: 19\_/02\_/\_\_\_2022\_\_**  **Grade: \_\_/40**

## Please write down all the steps not the final answer only

## Questions (25 points):

1. (5 points)

Word

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(a) Independent

(b) Independent and orthogonal

(c) Independent and orthonormal.

For orthonormal vectors,

1. becomes (1, 0), (0, 1) and (b) is (.6, .8), (.8, -.6).

A piece of paper with writing on it

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A whiteboard with writing on it

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1. (5 points)

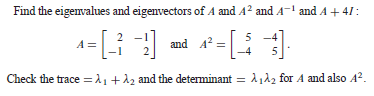
Graphical user interface, text, Word

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Diagram, schematic

Description automatically generated

1. (5 points)



(The trace is the sum of the main diagonal elements. It is also the sum of the eigenvalues. (the trace is invariant with respect to change in basis).

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A piece of paper with writing on it

Description automatically generated with medium confidence

1. (5 points)

A screenshot of a computer

Description automatically generated with medium confidence

A whiteboard with writing on it

Description automatically generated with medium confidence

A picture containing text, whiteboard

Description automatically generated

## Reading homework:

* **Determinants:** <https://www.youtube.com/watch?v=Ip3X9LOh2dk> (video 3blue1brown)
  + <https://medium.com/sho-jp/linear-algebra-101-part-5-determinants-b54f990782cc>
  + <https://www.mathsisfun.com/algebra/matrix-determinant.html>
  + <https://medium.com/linear-algebra/part-20-determinants-e4b2fbcce883>
  + <https://medium.com/linear-algebra/part-21-properties-of-determinants-1af8a231fd2b?source=---------0----------------------->
* **Inverse of a matrix**
  + <https://www.mathsisfun.com/algebra/matrix-inverse.html>
  + <https://www.mathsisfun.com/algebra/matrix-inverse-minors-cofactors-adjugate.html>
* **Some Applications of the Eigenvalues and Eigenvectors of a square matrix:**
  + A note by Michael Nasab (Lecturer at California State Polytechnic University) <https://www.cpp.edu/~manasab/eigenvalue.pdf>
* **What are Eigenvalues and Eigenvectors?**
  + <https://medium.com/fintechexplained/what-are-eigenvalues-and-eigenvectors-a-must-know-concept-for-machine-learning-80d0fd330e47>
  + <https://medium.com/sho-jp/linear-algebra-part-6-eigenvalues-and-eigenvectors-35365dc4365a>
* **Diagonalization**
  + <https://textbooks.math.gatech.edu/ila/diagonalization.html>
* **Principal component analysis (PCA)**
  + <https://towardsdatascience.com/pca-eigenvectors-and-eigenvalues-1f968bc6777a>