Data Science

Working with Data

**Task IV: Matrices**

**Part I:**

Calculate the eigenvalues and eigenvectors of the given matrix A = [[8, 6], [3, 4]], and provide a brief explanation of your calculations.

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**Part I:**

b. Perform eigen decomposition of matrix A using NumPy, and compare your results with those obtained in part (a). Include the code snippet and output.

**Python code:**

import numpy as np

matrix = np.array([[8,6],[3,4]])

eigenvalues, eigenvectors = np.linalg.eig(matrix)

print("Eigenvalues : ", eigenvalues)

print("Eigenvectors : ", eigenvectors)

**Results:**

Eigenvalues : [10.69041576 1.30958424]

Eigenvectors : [[ 0.91246614 -0.66764965]

[ 0.40915222 0.74447562]]

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**Comparison:**

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**Part II:**

Consider the following system of linear equations:

3x + 1y + 0z = 25

2x + 4y + 5z = 30

3x + 1y + 8z = -23

Solve the system of linear equations using matrix operations. Provide a clear explanation of each step in your calculations.

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**Part II**

b. Solve the same system of linear equations using NumPy's built-in functions. Include the code snippet and output. Compare your results with those obtained in part (a), and provide a brief explanation.

**Python code:**

import numpy as np

from numpy.linalg import inv

A = np.array ([

[3,1,0],

[2,4,5],

[3,1,8]

])

B = np.array ([

25,30,-23

])

X = inv(A).dot(B)

print(X)

**Results:**

[ 4. 13. -6.]

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