BINARY SOLUTIONS

MAT 275
Matrix Multiplication and Operations in MATLAB

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Introduction

This MATLAB script performs various matrix operations using predefined matrices A, B, and vectors b, c, and d. The operations include standard linear algebra matrix multiplication, checking commutatively, and performing additional multiplications.

Problem Statement

The goal is to create a script that demonstrates basic matrix operations, including multiplication and compatibility checks.

Solution Steps

- **Define Matrices and Vectors:**
  - Define matrices A, B, b, c, and d using the comma and colon notation.
- **Matrix Multiplications:**
  - Perform standard linear algebra matrix multiplication between matrices A and B (AB).
  - Check for commutatively by multiplying B and A (‘BA’).
  - Perform multiplication of vector c with matrix B (‘cB’).
  - Perform multiplication of matrix A with vector d (‘Ad’).

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MATLAB Code

```
clc; clear all; clf;

A=[1,4,2;2,5,8;3,6,9];

B=[1,2,3;4,5,6;7,8,9];

b=[4;23;27];

c=[4,3,2];

d=[1;2;3];

AB=A*B % Standard Linear Algebra Matrix Multiplication

BA=B*A % check for cummutivity

cB=c*B % possible multiplication since column of c is equal to row of B

Ad=A*d % resulted matrix has rows equal to rows of A and column equal to column of d
```

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Code Explanation

- **clc; clear all; clf**
  - Clears the command window and clears all variables from the MATLAB workspace also clears the current figure window.
- **Definition of matrices and vectors:**
  - A is a 3x3 matrix.
  - B is a 3x3 matrix.
  - b is a column vector.
  - c is a row vector.
  - d is a column vector.

Code Explanation

- **AB = A * B;**
  - Multiply matrices A and B using standard matrix multiplication.
- **BA = B * A;**
  - Multiply matrices B and A to check for commutativity.
- **cB = c * B;**
  - Multiply row vector ‘c’ by matrix ‘B’.
- **Ad = A * d;**
  - Multiply matrix A by column vector d.

Final Answer

The final output includes matrices resulting from matrix multiplications.

```
Command Window
PART A AB =
    31    38    45
    78    93   108
    90   108   126
BA =
    14    32    45
    32    77   102
    50   122   159
cB =
    30    39    48
Ad =
    15
    36
    42
```

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Additional Comments/Tips

The script showcases different types of matrix operations and the importance of compatibility in matrix multiplication.

Conclusion

The script successfully demonstrates basic matrix operations, providing insights into matrix multiplication and compatibility.