Experiment 10

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05/05/2023

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#1.Compute the QR factorization , SVD and Least square solution For \
    the given matrices. A=[1,2,3],[4,4,5],[6,2,1]B\
    =[-1,0,1],[2,1,5],[3,5,6]
A=[1,2,3],[4,4,5],[6,2,1]
B= [-1,0,1],[2,1,5],[3,5,6]
A=matrix(QQ,[[1,2,3],[4,4,5],[6,2,1]])
B=matrix(QQ,[[-1,0,1] , [2,1,5],[3,5,6]])
V=QQ^3
W=QQ^3
U=QQ^3
T=linear_transformation(W,V,A)
S=linear_transformation(U,V,B)
T
S
C=T*S
C
matrix_A=A.change_ring (QQ)
matrix_B=B.change_ring (QQ)
matrix_C=C.matrix ( )
matrix_AB=matrix_A * matrix_B
matrix_AB==matrix_C
```

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Vector space morphism represented by the matrix:
[1 2 3]
[4 4 5]
[6 2 1]
Domain: Vector space of dimension 3 over Rational Field
Codomain: Vector space of dimension 3 over Rational Field
Vector space morphism represented by the matrix:
[-1  0  1]
[ 2  1  5]
[ 3  5  6]
Domain: Vector space of dimension 3 over Rational Field
Codomain: Vector space of dimension 3 over Rational Field
Vector space morphism represented by the matrix:
[ 5  0 -2]
```

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[36 18 16]
[59 38 40]
Domain: Vector space of dimension 3 over Rational Field
Codomain: Vector space of dimension 3 over Rational Field
False
```

```
#2.Compute the QR factorization , SVD and Least square solution for \
    the given matrices A=[1,1,1],[2,2,2],[3,1,-1]B=[3,2,3],[2,1,2],[6\
     ,2,1]
A=[1 ,1 ,1],[2,2,2],[3,1,-1]
B=[3,2,3],[2,1,2],[6,2,1]
A=matrix(QQ,[[1,1,1],[2,2,2],[3,1,-1]])
B=matrix(QQ,[[3,2,3],[2,1,2],[6,2,1]])
V=QQ^3
W=QQ^3
U=QQ^3
T=linear_transformation (W,V,A)
S=linear_transformation(U,V,B)
T
S
C=T*S
C
matrix_A=A.change_ring (QQ)
matrix_B=B.change_ring (QQ)
matrix_C=C.matrix ( )
matrix_AB=matrix_A*matrix_B
matrix_AB==matrix_C
```

```
Vector space morphism represented by the matrix:
[ 1  1  1]
[ 2  2  2]
[ 3  1 -1]
Domain: Vector space of dimension 3 over Rational Field
Codomain: Vector space of dimension 3 over Rational Field
Vector space morphism represented by the matrix:
[3 2 3]
[2 1 2]
[6 2 1]
Domain: Vector space of dimension 3 over Rational Field
Codomain: Vector space of dimension 3 over Rational Field
Vector space morphism represented by the matrix:
[16 10  4]
[10  6  2]
[13 11  9]
Domain: Vector space of dimension 3 over Rational Field
Codomain: Vector space of dimension 3 over Rational Field
False
```