

```
> restart;
```

```
> with(LinearAlgebra);
```

```
[&x, Add, Adjoint, BackwardSubstitute, BandMatrix, Basis, BezoutMatrix, BidiagonalForm, BilinearForm, CharacteristicMatrix, CharacteristicPolynomial, Column, ColumnDimension, ColumnOperation, ColumnSpace, CompanionMatrix, ConditionNumber, ConstantMatrix, ConstantVector, Copy, CreatePermutation, CrossProduct, DeleteColumn, DeleteRow, Determinant, Diagonal, DiagonalMatrix, Dimension, Dimensions, DotProduct, EigenConditionNumbers, Eigenvalues, Eigenvectors, Equal, ForwardSubstitute, FrobeniusForm, GaussianElimination, GenerateEquations, GenerateMatrix, GetResultDataType, GetResultShape, GivensRotationMatrix, GramSchmidt, HankelMatrix, HermiteForm, HermitianTranspose, HessenbergForm, HilbertMatrix, HouseholderMatrix, IdentityMatrix, IntersectionBasis, IsDefinite, IsOrthogonal, IsSimilar, IsUnitary, JordanBlockMatrix, JordanForm, LA_Main, LUdecomposition, LeastSquares, LinearSolve, Map, Map2, MatrixAdd, MatrixExponential, MatrixFunction, MatrixInverse, MatrixMatrixMultiply, MatrixNorm, MatrixPower, MatrixScalarMultiply, MatrixVectorMultiply, MinimalPolynomial, Minor, Modular, Multiply, NoUserValue, Norm, Normalize, NullSpace, OuterProductMatrix, Permanent, Pivot, PopovForm, QRdecomposition, RandomMatrix, RandomVector, Rank, RationalCanonicalForm, ReducedRowEchelonForm, Row, RowDimension, RowOperation, RowSpace, ScalarMatrix, ScalarMultiply, ScalarVector, SchurForm, SingularValues, SmithForm, SubMatrix, SubVector, SumBasis, SylvesterMatrix, ToeplitzMatrix, Trace, Transpose, TridiagonalForm, UnitVector, VandermondeMatrix, VectorAdd, VectorAngle, VectorMatrixMultiply, VectorNorm, VectorScalarMultiply, ZeroMatrix, ZeroVector, Zip]
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```
> A:=Matrix([[1,0,0],[0,2,0],[0,0,1/2]]);
```

$$A := \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & \frac{1}{2} \end{bmatrix}$$

```
> B:=Matrix([[1,4],[5,-1]]);
```

$$B := \begin{bmatrix} 1 & 4 \\ 5 & -1 \end{bmatrix}$$

```
> C:=Matrix([[1,0],[0,-1],[2,3]]);
```

$$C := \begin{bmatrix} 1 & 0 \\ 0 & -1 \\ 2 & 3 \end{bmatrix}$$

```
> Dee:=Matrix([[1,2,-1],[0,1,0]]);
```

$$Dee := \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 0 \end{bmatrix}$$

> **A+B;**

Error, (in rtable/Sum) invalid arguments

> **A.C;**

$$\begin{bmatrix} 1 & 0 \\ 0 & -2 \\ 1 & \frac{3}{2} \end{bmatrix}$$

> **Dee.B;**

Error, (in LinearAlgebra:-MatrixMatrixMultiply) first matrix column dimension (3) <> second matrix row dimension (2)

> **Dee.A;**

$$\begin{bmatrix} 1 & 4 & \frac{-1}{2} \\ 0 & 2 & 0 \end{bmatrix}$$

> **C.Dee+A;**

$$\begin{bmatrix} 2 & 2 & -1 \\ 0 & 1 & 0 \\ 2 & 7 & \frac{-3}{2} \end{bmatrix}$$

> **Dee.C+A;**

Error, (in rtable/Sum) invalid arguments

> **Dee.C+(1/3)*B;**

$$\begin{bmatrix} \frac{-2}{3} & \frac{-11}{3} \\ \frac{5}{3} & \frac{-4}{3} \end{bmatrix}$$

> **Dee.C+x*B;**

$$\begin{bmatrix} -1 + x & -5 + 4 x \\ 5 x & -1 - x \end{bmatrix}$$

> **F:=Matrix([[2,4,2,-4,11,3],[2,4,4,-6,12,7]]);**

$$F := \begin{bmatrix} 2 & 4 & 2 & -4 & 11 & 3 \\ -2 & -4 & -2 & 4 & -11 & -1 \\ 2 & 4 & 4 & -6 & 12 & 7 \end{bmatrix}$$

> ?LinearAlgebra

> ReducedRowEchelonForm(F);

$$\begin{bmatrix} 1 & 2 & 0 & -1 & 5 & 0 \\ 0 & 0 & 1 & -1 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

>