```
> 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*]

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

```
> F:=Matrix([[2,4,2,-4,11,3],[-2,-4,-2,4,-11,-1],[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);
```

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

```
>
```