In[31]:=
```
(*EIGENVALUES AND EIGENVECTORS*)
Clear["Global`*"]
A = {{2, 1}, {1, 2}};
Print["Given Matrix A ="];
Print[MatrixForm[A]];
cp = CharacteristicPolynomial[A, x];
Print["Characteristic Polynomial = ", cp];
Print["Characteristic Equation:"];
Print[cp == 0];
ev = Eigenvalues[A];
Print["Eigenvalues = ", ev];
evec = Eigenvectors[A];
Print["Eigenvectors = ", evec];
es = Eigensystem[A];
Print["Eigensystem = "];
Print[es];
```

Given Matrix A =

$$\begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}$$

Characteristic Polynomial = $3 - 4x + x^2$

Characteristic Equation:

$3 - 4x + x^2 == 0$

Eigenvalues = {3, 1}

Eigenvectors = {{1, 1}, {-1, 1}}

Eigensystem =

{{3, 1}, {{1, 1}, {-1, 1}}}