```
Exit[]
```

```
n = 15;
```

```
m = SparseArray[
   {Band[{1, 2}] → -a, Band[{2, 1}] → -b, Band[{1, 1}] → 1 + a + b + c}, {n, n}];
```

```
t[n_] := Join[Eigenvalues[
    N[SparseArray[{Band[{1, 2}] → -1, Band[{2, 1}] → -1, Band[{1, 1}] → 2}, {n, n}]],
    -1], Eigenvalues[N[
     SparseArray[{Band[{1, 2}] → -1, Band[{2, 1}] → -1, Band[{1, 1}] → 2}, {n, n}]], 1]];
```

```
t[20]
```

```
{0.0223383, 3.97766}
```

```
n = 50; Join[Eigenvectors[
  N[SparseArray[{Band[{1, 2}] → -1, Band[{2, 1}] → -1, Band[{1, 1}] → 2}, {n, n}]],
  -1], Eigenvectors[
  N[SparseArray[{Band[{1, 2}] → -1, Band[{2, 1}] → -1, Band[{1, 1}] → 2}, {n, n}]], 1]]
```

```
{{-0.0121909, -0.0243355, -0.0363878, -0.0483021, -0.0600332, -0.0715365, -0.0827685,
  -0.0936865, -0.104249, -0.114416, -0.124149, -0.133412, -0.142168, -0.150385,
  -0.158031, -0.165078, -0.171499, -0.177269, -0.182366, -0.186772, -0.19047, -0.193445,
  -0.195686, -0.197185, -0.197936, -0.197936, -0.197185, -0.195686, -0.193445,
  -0.19047, -0.186772, -0.182366, -0.177269, -0.171499, -0.165078, -0.158031,
  -0.150385, -0.142168, -0.133412, -0.124149, -0.114416, -0.104249, -0.0936865,
  -0.0827685, -0.0715365, -0.0600332, -0.0483021, -0.0363878, -0.0243355, -0.0121909},
 {-0.0121909, 0.0243355, -0.0363878, 0.0483021, -0.0600331, 0.0715365, -0.0827685,
  0.0936865, -0.104249, 0.114416, -0.124149, 0.133412, -0.142168, 0.150385,
  -0.158031, 0.165078, -0.171499, 0.177269, -0.182366, 0.186772, -0.19047,
  0.193445, -0.195686, 0.197185, -0.197936, 0.197936, -0.197185, 0.195686,
  -0.193445, 0.19047, -0.186772, 0.182366, -0.177269, 0.171499, -0.165078, 0.158031,
  -0.150385, 0.142168, -0.133412, 0.124149, -0.114416, 0.104249, -0.0936865,
  0.0827685, -0.0715365, 0.0600332, -0.0483021, 0.0363878, -0.0243355, 0.0121909}}
```

```
LUDecomposition[SparseArray[{Band[{1, 2}] → -1,
    Band[{2, 1}] → -0.9, Band[{1, 1}] → 2}, {n, n}]][[1]] // MatrixForm
```

2.	−1.	0.	0.	0.	0.	0.	0.	0.
−0.45	1.55	−1.	0.	0.	0.	0.	0.	0.
0.	−0.580645	1.41935	−1.	0.	0.	0.	0.	0.
0.	0.	−0.634091	1.36591	−1.	0.	0.	0.	0.
0.	0.	0.	−0.658902	1.3411	−1.	0.	0.	0.
0.	0.	0.	0.	−0.671092	1.32891	−1.	0.	0.
0.	0.	0.	0.	0.	−0.677248	1.32275	−1.	0.
0.	0.	0.	0.	0.	0.	−0.680399	1.3196	−1.
0.	0.	0.	0.	0.	0.	0.	−0.682025	1.3179
0.	0.	0.	0.	0.	0.	0.	0.	−0.6828
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.

LUDecomposition

```
CholeskyDecomposition[SparseArray[<148>, {50, 50}]]
```

ListPlot[%]