Pensieve header: Making test matrices for JCF computations.

Matrix 1 - 3x3, 3 eigenvalues.

```
(R = Table[RandomInteger[{-2, 2}], {3}, {3}]) // MatrixForm
```

$$\begin{pmatrix} -1 & 0 & -1 \\ 1 & 0 & 0 \\ 0 & 1 & 2 \end{pmatrix}$$

```
Inverse[R] // MatrixForm
```

$$\begin{pmatrix} 0 & 1 & 0 \\ 2 & 2 & 1 \\ -1 & -1 & 0 \end{pmatrix}$$

```
(Inverse[R].{{1, 0, 0}, {0, 3, 0}, {0, 0, -2}}.R) // MatrixForm
```

$$\begin{pmatrix} 3 & 0 & 0 \\ 4 & -2 & -6 \\ -2 & 0 & 1 \end{pmatrix}$$

Matrix 2 - 3x3, one Jordan block.

```
(R = Table[RandomInteger[{-3, 3}], {3}, {3}]) // MatrixForm
```

$$\begin{pmatrix} -2 & 3 & 1 \\ -3 & -1 & 2 \\ -1 & -2 & 1 \end{pmatrix}$$

```
Inverse[R] // MatrixForm
```

$$\begin{pmatrix} \frac{3}{2} & -\frac{5}{2} & \frac{7}{2} \\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ \frac{5}{2} & -\frac{7}{2} & \frac{11}{2} \end{pmatrix}$$

```
(Inverse[R].{{3, 0, 0}, {1, 3, 0}, {0, 1, 3}}.R) // MatrixForm
```

$$\begin{pmatrix} -\frac{5}{2} & -11 & \frac{9}{2} \\ -\frac{1}{2} & 1 & \frac{1}{2} \\ -\frac{19}{2} & -16 & \frac{21}{2} \end{pmatrix}$$

Matrix 3 - 4x4, mixed Jordan form.

```
(R = Table[RandomInteger[{-2, 2}], {4}, {4}]) // MatrixForm
```

$$\begin{pmatrix} 1 & 2 & 0 & -2 \\ 2 & 0 & 1 & -2 \\ -1 & -2 & 0 & -2 \\ -1 & 0 & -1 & 2 \end{pmatrix}$$

```
Inverse[R] // MatrixForm
```

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

```
(Inverse[R].{{1, 0, 0, 0}, {0, 2, 0, 0}, {0, 0, 2, 0}, {0, 0, 1, 2}}.R) // MatrixForm
```

$$\begin{pmatrix} 1 & -2 & 0 & -2 \\ \frac{1}{4} & \frac{5}{2} & 0 & \frac{3}{2} \\ \frac{5}{2} & 5 & 2 & 3 \\ \frac{1}{4} & \frac{1}{2} & 0 & \frac{3}{2} \end{pmatrix}$$