Liliane Gikendi 19

$$\begin{bmatrix} 4 & 8 & -1 & -2 \\ -2 & -9 & -2 & -4 \\ 0 & 10 & 5 & -10 \\ -1 & -13 & -14 & -13 \end{bmatrix}$$

Forming a new matrix by $-\lambda$

$$\begin{bmatrix} 4-\lambda & 8 & -1 & -2 \\ -2 & -\lambda-9 & -2 & -4 \\ 0 & 10 & 5-\lambda & -10 \\ -1 & -13 & -14 & -\lambda-13 \end{bmatrix}$$

$$\det \begin{bmatrix} 4-\lambda & 8 & -1 & -2 \\ -2 & -\lambda-9 & -2 & -4 \\ 0 & 10 & 5-\lambda & -10 \\ -1 & -13 & -14 & -\lambda-13 \end{bmatrix}$$

$= -10\lambda - 10(4-\lambda)(2\lambda-30) + 10(4-\lambda)(14\lambda+140) +$
$(5-\lambda)(-14\lambda+(4-\lambda)((-\lambda-13)(-\lambda-9)-52)-210)-1950$

$-10\lambda - 10(4-\lambda)(2\lambda-30) + 10(4-\lambda(4\lambda+140) + (5-\lambda)$
$(-14\lambda+(4-\lambda)((-\lambda-13)(-\lambda-9)-52)-210)-1950=0$

$\lambda = 1,$

$\lambda - 1$

$$A^{-1} = \begin{bmatrix} 4-\lambda & -2 & 10 & -1 \\ 8 & 9-\lambda & 10 & -13 \\ -1 & -2 & 5-\lambda & -14 \\ -2 & -4 & -10 & -13-\lambda \end{bmatrix}$$

$$= \begin{bmatrix} 3 & -2 & 0 & -1 \\ 8 & 8 & 10 & -13 \\ -1 & -2 & 4 & -14 \\ -2 & -4 & -10 & -14 \end{bmatrix}$$

$$-10\lambda + (5-\lambda)(-14\lambda + (4-\lambda)((-\lambda-13)(-\lambda-9)-52)-210) - (40-10\lambda)$$

$$(2\lambda - 30) + (40-10\lambda)(14\lambda + 100) - 1970 = 0$$

~~$(5-\lambda)(-14\lambda + (4-\lambda)$~~

$$\lambda = -5.604620607963\overline{55}$$

$$\begin{bmatrix} 4-\lambda & 8 & -1 & -2 \\ -2 & -\lambda-9 & -2 & -4 \\ 0 & 10 & 5-\lambda & -10 \\ -1 & -13 & -14 & -\lambda-13 \end{bmatrix} = \begin{bmatrix} 9.604620 & 8 & -1 & \\ -2 & -3.395797\overline{93} & -2 & \\ 0 & 10 & 10.604620\overline{6} & \\ -1 & -13 & -14 & \end{bmatrix}$$

$$\begin{bmatrix} -2 \\ -4 \\ -10 \\ -\lambda 39597\overline{93}42 \end{bmatrix}$$

$$\lambda_1 = 2.67459$$

For $\lambda = 1.67459$

$M = A - \lambda I$

$$M = \begin{pmatrix} 4 - 2.67459 & 8 & -1 & -2 \\ -2 & 9 - 2.67459 & -2 & -4 \\ 0 & 10 & 5 - 2.67459 & -16 \\ -1 & -13 & -14 & -13 - 2.67459 \end{pmatrix}$$

$$= \begin{pmatrix} -1.32541 & 8.00000 & -1.00000 & -2.00000 \\ -2.0000 & 6.32541 & -2.00000 & -4.00000 \\ 0.0000 & 10.00000 & 2.32541 & -10.00000 \\ -1.0000 & -13.00000 & -14.0000 & -15.67459 \end{pmatrix}$$

elimination

$$\begin{pmatrix} 1.32541 & 8.0000 & -1.0000 & -2.00000 \\ 0 & 15.3934 & -3.5055 & -7.0132 \\ 0 & 10.0000 & 2.32541 & -10.0000 \\ 0 & -6.9676 & -14.753 & -17.1532 \end{pmatrix}$$

$$\begin{pmatrix} 1.32541 & 8.0000 & -1.000 & -2.0000 \\ 0 & 15.3934 & -3.5055 & -7.0132 \\ 0 & 0 & 4.2344 & -6.1539 \\ 0 & 0 & 0 & -43.3352 \end{pmatrix}$$

$$y_1 = \begin{bmatrix} -8.4943615018691546 \\ 1.4271017522560194 \\ -1.8384149460292711 \\ 1 \end{bmatrix}$$