Eigenwerte und Eigenvektoren

Stufe 3: 3×3: Eigenwerte

Name: _____ Datum: _____

Bestimme alle Eigenwerte der 3×3-Matrix. Nutze Nullen geschickt aus (Dreiecks- oder Blockgestalt).

1) $A = \begin{pmatrix} 10 & 3 & -2 \\ -10 & -1 & -2 \\ 0 & 0 & 1 \end{pmatrix}$ _____

2) $A = \begin{pmatrix} 3 & -3 & 4 \\ 0 & 0 & 1 \\ 0 & 0 & -1 \end{pmatrix}$ _____

3) $A = \begin{pmatrix} -2 & 0 & 1 \\ 0 & 4 & 12 \\ 0 & 0 & 0 \end{pmatrix}$ _____

4) $A = \begin{pmatrix} -2 & -2 & 4 \\ 0 & 3 & 4 \\ 0 & 0 & 0 \end{pmatrix}$ _____

5) $A = \begin{pmatrix} -4 & -1 & 2 \\ 0 & 3 & 0 \\ 0 & 0 & -1 \end{pmatrix}$ _____

6) $A = \begin{pmatrix} -4 & -3 & 3 \\ 10 & 7 & 0 \\ 0 & 0 & -2 \end{pmatrix}$ _____

7) $A = \begin{pmatrix} -8 & 9 & 2 \\ -6 & 7 & 2 \\ 0 & 0 & -3 \end{pmatrix}$ _____

8) $A = \begin{pmatrix} -1 & 0 & 0 \\ -3 & 3 & 0 \\ 1 & -2 & -3 \end{pmatrix}$ _____

9) $A = \begin{pmatrix} 4 & 2 & 0 \\ 0 & 1 & 0 \\ 0 & 2 & 2 \end{pmatrix}$ _____

10) $A = \begin{pmatrix} 0 & -2 & 3 \\ 0 & 5 & 9 \\ 0 & 0 & 2 \end{pmatrix}$ _____

11) $A = \begin{pmatrix} -4 & 6 & 1 \\ -3 & 5 & -2 \\ 0 & 0 & 4 \end{pmatrix}$ _____

12) $A = \begin{pmatrix} 5 & 2 & -2 \\ 0 & 1 & -3 \\ 0 & 0 & 6 \end{pmatrix}$ _____

13) $A = \begin{pmatrix} -4 & 2 & -2 \\ 0 & 2 & -2 \\ 0 & 0 & 6 \end{pmatrix}$ _____

14) $A = \begin{pmatrix} -6 & -5 & 1 \\ 10 & 9 & -3 \\ 0 & 0 & 1 \end{pmatrix}$ _____

15) $A = \begin{pmatrix} -2 & -3 & -2 \\ 0 & 3 & -2 \\ 0 & 0 & 6 \end{pmatrix}$ _____

16) $A = \begin{pmatrix} 6 & 1 & 1 \\ -6 & 1 & -3 \\ 0 & 0 & 2 \end{pmatrix}$ _____

Lösungen: Eigenwerte und Eigenvektoren

Stufe 3: 3×3: Eigenwerte

1) $\lambda_1 = 1,\ \lambda_2 = 4,\ \lambda_3 = 5$

2) $\lambda_1 = -1,\ \lambda_2 = 0,\ \lambda_3 = 3$

3) $\lambda_1 = -2,\ \lambda_2 = 0,\ \lambda_3 = 4$

4) $\lambda_1 = -2,\ \lambda_2 = 0,\ \lambda_3 = 3$

5) $\lambda_1 = -4,\ \lambda_2 = -1,\ \lambda_3 = 3$

6) $\lambda_1 = -2,\ \lambda_2 = 1,\ \lambda_3 = 2$

7) $\lambda_1 = -3,\ \lambda_2 = -2,\ \lambda_3 = 1$

8) $\lambda_1 = -3,\ \lambda_2 = -1,\ \lambda_3 = 3$

9) $\lambda_1 = 1,\ \lambda_2 = 2,\ \lambda_3 = 4$

10) $\lambda_1 = 0,\ \lambda_2 = 2,\ \lambda_3 = 5$

11) $\lambda_1 = -1,\ \lambda_2 = 2,\ \lambda_3 = 4$

12) $\lambda_1 = 1,\ \lambda_2 = 5,\ \lambda_3 = 6$

13) $\lambda_1 = -4,\ \lambda_2 = 2,\ \lambda_3 = 6$

14) $\lambda_1 = -1,\ \lambda_2 = 1,\ \lambda_3 = 4$

15) $\lambda_1 = -2,\ \lambda_2 = 3,\ \lambda_3 = 6$

16) $\lambda_1 = 2,\ \lambda_2 = 3,\ \lambda_3 = 4$