

Matrix 4x4 หรือ A^{-1}

$$A = \begin{bmatrix} 2 & 3 & 4 & 5 \\ 3 & 3 & 8 & 4 \\ 1 & 4 & 6 & 2 \\ 2 & 1 & 5 & 3 \end{bmatrix} \quad \therefore |A| = -27$$

$$C = \begin{bmatrix} 0 & -4 & 5 & -7 \\ -54 & -19 & 12 & 21 \\ 27 & 1 & -8 & -5 \\ 54 & 26 & -19 & -22 \end{bmatrix} \quad \text{adj } A = C^T = \begin{bmatrix} 0 & -54 & 27 & 54 \\ -4 & -19 & 1 & 26 \\ 5 & 1 & -8 & -19 \\ -7 & 26 & -5 & -22 \end{bmatrix}$$

$$\therefore A^{-1} = \frac{\text{adj } A}{|A|} = \frac{1}{-27} \begin{bmatrix} 0 & -54 & 27 & 54 \\ -4 & -19 & 1 & 26 \\ 5 & 1 & -8 & -19 \\ -7 & 26 & -5 & -22 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 2 & -1 & -2 \\ 0.15 & 0.7 & -0.04 & -0.96 \\ -0.19 & -0.7 & 0.3 & 0.7 \\ 0.26 & -0.78 & 0.19 & 0.81 \end{bmatrix}$$

Input

$$\begin{pmatrix} 2 & 3 & 4 & 5 \\ 3 & 3 & 8 & 4 \\ 1 & 4 & 6 & 2 \\ 2 & 1 & 5 & 3 \end{pmatrix}^{-1} \quad (\text{matrix inverse})$$

Result

$$\frac{1}{27} \begin{pmatrix} 0 & 54 & -27 & -54 \\ 4 & 15 & -1 & -26 \\ -5 & -12 & 8 & 19 \\ 7 & -21 & 5 & 22 \end{pmatrix}$$

Expanded form

$$\begin{pmatrix} 0 & 2 & -1 & -2 \\ \frac{4}{27} & \frac{5}{9} & -\frac{1}{27} & -\frac{26}{27} \\ -\frac{5}{27} & -\frac{4}{9} & \frac{8}{27} & \frac{19}{27} \\ \frac{7}{27} & -\frac{2}{9} & \frac{5}{27} & \frac{22}{27} \end{pmatrix}$$

Dimensions

4 (rows) × 4 (columns)

Matrix plot



Trace

$$5$$

Determinant

$$-\frac{1}{27}$$

Characteristic polynomial

$$\lambda^4 - \frac{5\lambda^3}{3} + \frac{14\lambda}{27} - \frac{1}{27}$$

Eigenvalues

$$\lambda_1 \approx 1.42366$$

$$\lambda_2 \approx 0.689812$$

$$\lambda_3 \approx -0.519429$$

$$\lambda_4 \approx 0.0726052$$

Eigenvectors

$$v_1 \approx (-6.5196, -2.3334, 2.615, 1)$$

$$v_2 \approx (7.17195, 1.71293, -3.52143, 1)$$

$$v_3 \approx (-1.47593, 1.07817, -0.610301, 1)$$

$$v_4 \approx (1.29726, 1.69541, 1.29664, 1)$$

Approximate form

Step-by-step solution

Diagonalization

$$M = SJS^{-1}$$

where

$$M = \begin{pmatrix} 0 & 2 & -1 & -2 \\ 0.148148 & 0.555556 & -0.037037 & -0.962963 \\ -0.185185 & -0.444444 & 0.296296 & 0.703704 \\ 0.259259 & -0.777778 & 0.185185 & 0.814815 \end{pmatrix}$$

$$S = \begin{pmatrix} -1.47593 & 1.29726 & 7.17195 & -6.5196 \\ 1.07817 & 1.69541 & 1.71293 & -2.3334 \\ -0.610301 & 1.29664 & -3.52143 & 2.615 \\ 1 & 1 & 1 & 1 \end{pmatrix}$$

$$J = \begin{pmatrix} -0.519429 & 0 & 0 & 0 \\ 0 & 0.0726052 & 0 & 0 \\ 0 & 0 & 0.689812 & 0 \\ 0 & 0 & 0 & 1.42366 \end{pmatrix}$$

$$S^{-1} \approx \begin{pmatrix} -0.241828 & 0.373159 & -0.293505 & 0.0616249 \\ 0.0982406 & 0.16476 & 0.328958 & 0.167719 \\ 0.105977 & -0.231529 & -0.0791761 & 0.35772 \\ 0.0375106 & -0.306389 & 0.0446226 & 0.412936 \end{pmatrix}$$

Condition number

90

Approximate form

Step-by-step solution

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Approximate form

Step-by-step solution

Characteristic polynomial »

Exact forms

Step-by-step solution

Exact forms

Step-by-step solution