Matrix Analysis Report

Generated by Matrix Class

January 26, 2025

1 Original Matrix

$$\begin{bmatrix} -1.0000 & 2.0000 & 3.0000 & 4.0000 & 5.0000 \\ 6.0000 & 7.0000 & 8.0000 & 9.0000 & 10.0000 \\ 11.0000 & 12.1000 & 13.4000 & 14.4000 & 15.8000 \\ 16.9000 & 17.8000 & 18.0000 & 19.7000 & 20.6000 \\ 21.3000 & 22.2000 & 23.6000 & 24.1000 & 25.0000 \end{bmatrix}$$

2 Determinant

The determinant of the matrix is:

$$det(A) = -17.340$$

3 Trace

The trace of the matrix is:

$$Tr(A) = 64.100$$

4 Inverse Matrix

The inverse of the matrix is:

$$\begin{bmatrix} -0.5052 & 0.7093 & -0.0346 & -0.0692 & -0.1038 \\ 0.8069 & -3.8791 & 2.0461 & 0.7589 & -0.5283 \\ -0.0076 & 0.3070 & -0.0507 & -0.9348 & 0.6811 \\ -0.3640 & 6.3486 & -5.7601 & 0.1465 & 1.0530 \\ 0.0720 & -3.5696 & 3.8132 & 0.1263 & -1.0606 \end{bmatrix}$$

5 Verification

Multiplying the original matrix with its inverse ($A \cdot A^{-1}$) should give the identity matrix:

$$\begin{bmatrix} 1.0000 & -0.0000 & 0.0000 & 0.0000 & -0.0000 \\ 0.0000 & 1.0000 & 0.0000 & -0.0000 & -0.0000 \\ 0.0000 & -0.0000 & 1.0000 & -0.0000 & -0.0000 \\ 0.0000 & 0.0000 & -0.0000 & 1.0000 & -0.0000 \\ 0.0000 & -0.0001 & 0.0000 & -0.0001 & 1.0000 \end{bmatrix}$$

6 Eigenvalues

The eigenvalues of the matrix are:

$$\lambda_1 = 69.776$$
$$\lambda_2 = -5.150$$
$$\lambda_3 = -0.768$$
$$\lambda_4 = 0.400$$
$$\lambda_5 = -0.157$$

7 Matrix Norms

$$\text{Frobenius Norm} = 75.744$$
$$\text{Maximum Norm} = 25.000$$

8 Matrix Properties

- Symmetric: No
- Orthogonal: No
- Positive Definite: No
- Rank: 5 (Nullity: 0)

9 Statistical Analysis

9.1 Basic Statistics

$$\text{Mean} = 13.156$$
$$\text{Variance} = 56.406$$
$$\text{Sum} = 328.900$$

10 Matrix Decompositions

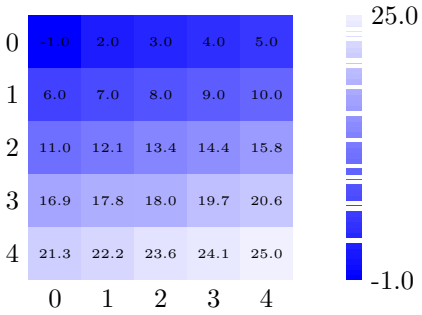
10.1 LU Decomposition

$$L = \begin{bmatrix} 1.0000 & 0.0000 & 0.0000 & 0.0000 & 0.0000 \\ -6.0000 & 1.0000 & 0.0000 & 0.0000 & 0.0000 \\ -11.0000 & 1.7947 & 1.0000 & 0.0000 & 0.0000 \\ -16.9000 & 2.7158 & 7.2601 & 1.0000 & 0.0000 \\ -21.3000 & 3.4105 & 4.4601 & 0.1191 & 1.0000 \end{bmatrix}$$

$$U = \begin{bmatrix} -1.0000 & 2.0000 & 3.0000 & 4.0000 & 5.0000 \\ 0.0000 & 19.0000 & 26.0000 & 33.0000 & 40.0000 \\ 0.0000 & 0.0000 & -0.2632 & -0.8263 & -0.9895 \\ 0.0000 & 0.0000 & -0.0000 & 3.6781 & 3.6521 \\ 0.0000 & -0.0000 & 0.0000 & 0.0000 & -0.9429 \end{bmatrix}$$

11 Matrix Visualization

11.1 Heatmap



11.2 Row Means Distribution