

Solution of System of Linear Algebraic Equations

$$\begin{cases} 1x_1 + 2x_2 + 3x_3 = 13 \\ 4x_1 + 5x_2 + -6x_3 = 7 \\ -7x_1 + 8x_2 + 19x_3 = 12 \end{cases}$$

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & -6 \\ -7 & 8 & 19 \end{pmatrix}$$

$$B = \begin{pmatrix} 13 \\ 7 \\ 12 \end{pmatrix}$$

$$A_{11} = (-1)^{1+1} \begin{vmatrix} 5 & -6 \\ 8 & 19 \end{vmatrix} = 143$$

$$A_{12} = (-1)^{1+2} \begin{vmatrix} 4 & -6 \\ -7 & 19 \end{vmatrix} = -34$$

$$A_{13} = (-1)^{1+3} \begin{vmatrix} 4 & 5 \\ -7 & 8 \end{vmatrix} = 67$$

$$A_{21} = (-1)^{2+1} \begin{vmatrix} 2 & 3 \\ 8 & 19 \end{vmatrix} = -14$$

$$A_{22} = (-1)^{2+2} \begin{vmatrix} 1 & 3 \\ -7 & 19 \end{vmatrix} = 40$$

$$A_{23} = (-1)^{2+3} \begin{vmatrix} 1 & 2 \\ -7 & 8 \end{vmatrix} = -22$$

$$A_{31} = (-1)^{3+1} \begin{vmatrix} 2 & 3 \\ 5 & -6 \end{vmatrix} = -27$$

$$A_{32} = (-1)^{3+2} \begin{vmatrix} 1 & 3 \\ 4 & -6 \end{vmatrix} = 18$$

$$A_{33} = (-1)^{3+3} \begin{vmatrix} 1 & 2 \\ 4 & 5 \end{vmatrix} = -3$$

$$A^{-1} = \frac{1}{276} \begin{pmatrix} 143 & -14 & -27 \\ -34 & 40 & 18 \\ 67 & -22 & -3 \end{pmatrix} = \begin{pmatrix} 0.51812 & -0.05072 & -0.09783 \\ -0.12319 & 0.14493 & 0.06522 \\ 0.24275 & -0.07971 & -0.01087 \end{pmatrix}$$

$$X = \begin{pmatrix} 5.20652 \\ 0.19565 \\ 2.46739 \end{pmatrix}$$