

Chapter 3: Systems of linear Equations

1-Cramer's Rule

Q1) Solve by Cramer's rule:

a) $\begin{cases} 7x_1 - 2x_2 = 3 \\ 3x_1 + x_2 = 5 \end{cases}$	b) $\begin{cases} 4x + 2y = 8 \\ -2x + y = -4 \end{cases}$
c) $\begin{cases} 4x + 5y = 2 \\ 11x + y + 2z = 3 \\ x + 5y + 2z = 1 \end{cases}$	d) $\begin{cases} x_1 - 4x_2 + x_3 = 6 \\ 4x_1 - x_2 + 2x_3 = -1 \\ 2x_1 + 2x_2 - 3x_3 = -20 \end{cases}$
e) $\begin{cases} -x_1 - 4x_2 + 2x_3 + x_4 = -32 \\ 2x_1 - x_2 + 7x_3 + 9x_4 = 14 \\ -x_1 + x_2 + 3x_3 + x_4 = 11 \\ x_1 - 2x_2 + x_3 - 4x_4 = -4 \end{cases}$	g) $\begin{cases} 2x - 3y + 5z = 0 \\ y - 3z = 10 \\ 2z = 4 \end{cases}$
f) $\begin{cases} 4x + y + z + w = 6 \\ 3x + 7y - z + w = 1 \\ 7x + 3y - 5z + 8w = -3 \\ x + y + z + 2w = 3 \end{cases}$	

2-Gauss Elimination Method

Q1) Use Gauss elimination method to solve the systems of equations:

1) $\begin{cases} x - 3y + 4z = 7 \\ y + 2z = 2 \\ z = 5 \end{cases}$	2) $\begin{cases} x + 8z - 5t = 6 \\ y + 4z - 9t = 3 \\ z + t = 2 \\ t = 1 \end{cases}$
3) $\begin{cases} x_1 + x_2 + 2x_3 = 8 \\ -x_1 - 2x_2 + 3x_3 = 1 \\ 3x_1 - 7x_2 + 4x_3 = 10 \end{cases}$	4) $\begin{cases} 2x + 2y + 2z = 0 \\ -2x + 5y + 2z = 1 \\ 8x + y + 4z = -1 \end{cases}$
5) $\begin{cases} x - y + 2z - w = -1 \\ 2x + y - 2z - 2w = -2 \\ -x + 2y - 4z + w = 1 \\ 3x - 3w = -3 \end{cases}$	6) $\begin{cases} -2b + 3c = 1 \\ 3a + 6b - 3c = -2 \\ 6a + 6b + 3c = 5 \end{cases}$

2-Gauss-jordan Method

Q1)Solve by Gauss-Jordan elimination:

1) $\begin{cases} 2x - y - 3z = 0 \\ -x + 2y - 3z = 0 \\ x + y + 4z = 0 \end{cases}$	2) $\begin{cases} 2x + y + 3z = 0 \\ x + 2y = 0 \\ y + z = 0 \end{cases}$
3) $\begin{cases} y + 3z - 2w = 0 \\ 2x + y - 4z + 3w = 0 \\ 2x + 3y + 2z - w = 0 \\ -4x - 3y + 5z - 4w = 0 \end{cases}$	4) $\begin{cases} x_1 + x_2 + 2x_3 = 8 \\ -x_1 - 2x_2 + 3x_3 = 1 \\ 3x_1 - 7x_2 + 4x_3 = 10 \end{cases}$
5) $\begin{cases} 2x + 2y + 2z = 0 \\ -2x + 5y + 2z = 1 \\ 8x + y + 4z = -1 \end{cases}$	6) $\begin{cases} 2x_1 - x_2 + 3x_3 + 4x_4 = 9 \\ x_1 - 2x_3 + 7x_4 = 11 \\ 3x_1 - 3x_2 + x_3 + 5x_4 = 8 \\ 2x_1 + x_2 + 4x_3 + 4x_4 = 10 \end{cases}$