Contents

1 Part 1

In section 3.2. I will focus on the method of Gaussian Elimination and later on the Gauss-Jordan Elimination (for section 3.3).

Consider the augmented matrix

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 3 & -15 & -5 & 2 & 27 \\ -2 & 10 & 3 & -4 & -28 \\ 5 & -25 & -2 & -1 & 15 \end{array}\right]$$

Set 1

$$R_1 = \frac{1}{3}r_1$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -\frac{5}{3} & \frac{2}{3} & 9 \\ -2 & 10 & 3 & -4 & -28 \\ 5 & -25 & -2 & -1 & 15 \end{array}\right]$$

$$R_2 = r_2 + 2r_1$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -\frac{5}{3} & \frac{2}{3} & 9 \\ 0 & 0 & -\frac{1}{3} & -\frac{8}{3} & -10 \\ 5 & -25 & -2 & -1 & 15 \end{array}\right]$$

$$R_3 = r_3 - 5r_1$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -\frac{5}{3} & \frac{2}{3} & 9 \\ 0 & 0 & -\frac{1}{3} & -\frac{8}{3} & -10 \\ 0 & 0 & \frac{19}{3} & -\frac{13}{3} & -30 \end{array}\right]$$

$$R_2 = -3r_2$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -\frac{5}{3} & \frac{2}{3} & 9 \\ 0 & 0 & 1 & 8 & 30 \\ 0 & 0 & \frac{19}{3} & -\frac{13}{3} & -30 \end{array}\right]$$

$$R_3 = r_3 - \frac{19}{3}r_2$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -\frac{5}{3} & \frac{2}{3} & 9 \\ 0 & 0 & 1 & 8 & 30 \\ 0 & 0 & 0 & -55 & -220 \end{array}\right]$$

$$R_3 = -\frac{1}{55}r_3$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -\frac{5}{3} & \frac{2}{3} & 9 \\ 0 & 0 & 1 & 8 & 30 \\ 0 & 0 & 0 & 1 & 4 \end{array}\right]$$

Set 2

$$R_1 = r_1 + r_2$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -2 & -2 & -1 \\ -2 & 10 & 3 & -4 & -28 \\ 5 & -25 & -2 & -1 & 15 \end{array}\right]$$

$$R_2 = r_2 + 2r_1$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -2 & -2 & -1 \\ 0 & 0 & -1 & -8 & -30 \\ 5 & -25 & -2 & -1 & 15 \end{array}\right]$$

$$R_3 = r_3 - 5r_1$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -2 & -2 & -1 \\ 0 & 0 & -1 & -8 & -30 \\ 0 & 0 & 8 & 9 & 20 \end{array}\right]$$

$$R_2 = -r_2$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -2 & -2 & -1 \\ 0 & 0 & 1 & 8 & 30 \\ 0 & 0 & 8 & 9 & 20 \end{array}\right]$$

$$R_3 = r_3 - 8r_2$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -2 & -2 & -1 \\ 0 & 0 & 1 & 8 & 30 \\ 0 & 0 & 0 & -55 & -220 \end{array}\right]$$

$$R_3 = -\frac{1}{55}r_3$$

$$[A|\vec{b}] = \left[\begin{array}{cccc|c} 1 & -5 & -2 & -2 & -1 \\ 0 & 0 & 1 & 8 & 30 \\ 0 & 0 & 0 & 1 & 4 \end{array}\right]$$