Gauss-Jordan Elimination

استبعاد جاوس - جوردن لحل انظمة المعادلات الخطية

حل نظام المعادلات الخطي التالي باستخدام طريقة

استبعاد جاوس جوردن

$$x + 3y + 2z = 2 \quad (1)$$

$$2x + 7y + 7z = -1 \quad (2)$$

$$2x + 5y + 2z = 7 \quad (3)$$

$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 2 \\ 2 & 7 & 7 & -1 \\ 2 & 5 & 2 & 7 \end{array}\right]$$

Echelon Augmented Matrix

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & \\ 0 & 1 & 0 & \\ 0 & 0 & 1 & \end{array}\right] = I$$

$R_2(-1) \longrightarrow R_2$

$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 2 \\ -2 & -7 & -7 & +1 \\ 2 & 5 & 2 & 7 \end{array}\right]$$

✓

$R_3 + R_1 \longrightarrow R_3$

$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 2 \\ 0 & -2 & -5 & 8 \\ 2 & 5 & 2 & 7 \end{array}\right]$$

$$R_1(-2) + R_3 \longrightarrow R_3$$

$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 2 \\ 0 & -2 & -5 & 8 \\ 0 & -1 & -2 & +3 \end{array}\right]$$

$$R_2(-1) \longrightarrow R_2$$

$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 2 \\ 0 & 2 & 5 & -8 \\ 0 & -1 & -2 & 3 \end{array}\right]$$

✓

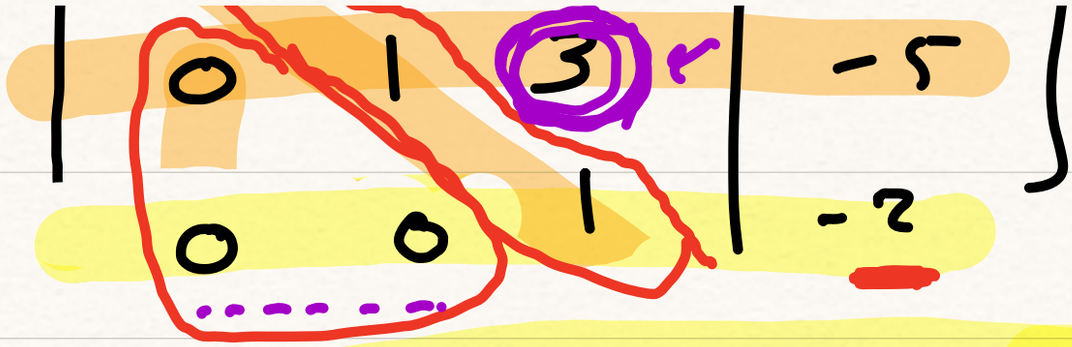
$$R_2 + R_3 \longrightarrow R_2$$

$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 2 \\ 0 & 1 & 3 & -5 \\ 0 & -1 & -2 & 3 \end{array}\right]$$

✓

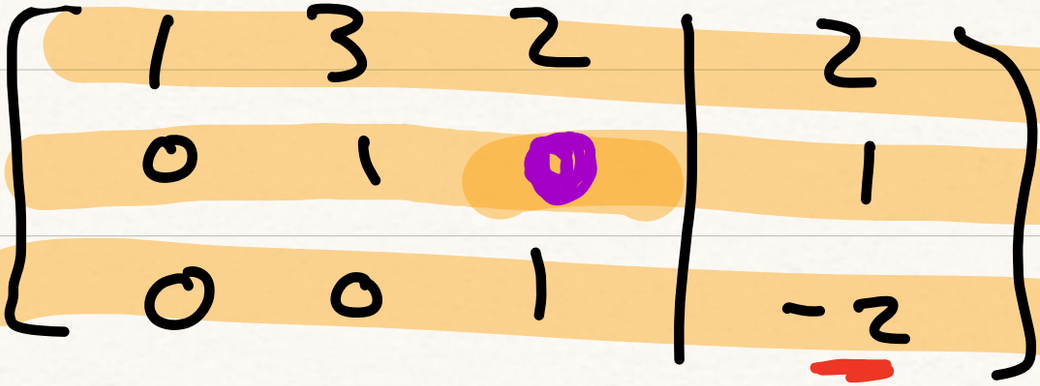
$$R_2 + R_3 \longrightarrow R_3$$

$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 2 \\ \end{array}\right.$$



$$\left[\begin{array}{ccc|c} 0 & 1 & 3 & -5 \\ 0 & 0 & 1 & -2 \end{array}\right]$$

$R_3(-3) + R_2 \longrightarrow R_2$



$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 2 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & -2 \end{array}\right]$$

$R_3(-2) + R_1 \longrightarrow R_1$

$$\left[\begin{array}{ccc|c} 1 & 2 & 0 & 6 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & -2 \end{array}\right] \quad \checkmark$$

$$R_2(-3) + R_1 \rightarrow R_1$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & -2 \end{array}\right] \quad \checkmark$$

$$\rightarrow \quad x = +3$$

$y = 1$

$z = -2$