

17 Marz

3

Q-R

Σίστημα

2x4:

$$\begin{cases} x+3y=7 \\ 2x+4y=10 \end{cases}$$

$$Ax=b = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ 10 \end{bmatrix}$$

A = QR :

$$QRx = b \Rightarrow \begin{pmatrix} \text{ano} \\ 2 \times 3 \end{pmatrix}$$

$$\begin{bmatrix} \frac{1}{\sqrt{5}} & \frac{2}{\sqrt{5}} \\ \frac{2}{\sqrt{5}} & -\frac{1}{\sqrt{5}} \end{bmatrix} \begin{bmatrix} \sqrt{5} \\ 0 \end{bmatrix} = \begin{bmatrix} \frac{1}{\sqrt{5}} & \frac{2}{\sqrt{5}} \\ \frac{2}{\sqrt{5}} & -\frac{1}{\sqrt{5}} \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ 10 \end{bmatrix}$$

$$Rx = Q^T b \Rightarrow \begin{bmatrix} \sqrt{5} & \frac{1}{\sqrt{5}} \\ 0 & \frac{2}{\sqrt{5}} \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} \frac{1}{\sqrt{5}} & \frac{2}{\sqrt{5}} \\ \frac{2}{\sqrt{5}} & -\frac{1}{\sqrt{5}} \end{bmatrix} \begin{bmatrix} 7 \\ 10 \end{bmatrix}$$

⇒

$$\begin{bmatrix} \sqrt{5} & \frac{11}{\sqrt{5}} \\ 0 & \frac{2}{\sqrt{5}} \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} \frac{27}{\sqrt{5}} \\ \frac{4}{\sqrt{5}} \end{bmatrix}$$

Τριγωνικό σύστημα

$$\frac{2}{\sqrt{5}}y = \frac{4}{\sqrt{5}} \Rightarrow y = 2$$

$$\sqrt{5}x + \frac{11}{\sqrt{5}}y = \frac{27}{\sqrt{5}} \Rightarrow x = 1$$

















