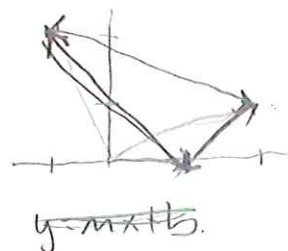


2. Find the equation  $f(x) = ax + b$  of the least square line for the points  $(1, 0)$ ,  $(-1, 2)$ ,  $(2, 1)$ .

$$\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ -1 & 2 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} b \\ b \end{bmatrix} \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & 1 \end{bmatrix}$$



$$1 \cdot 1 + 0 \cdot 2 = 1 \cdot x + 0 \cdot y \quad y = ax + b$$

$$f(x) = ax + b$$

$$Ax = b \quad \checkmark \quad A^T Ax = A^T b$$

$$1 \cdot (-1) + 2 \cdot 2 = a(-1) + b \quad 0 = a(1) + b$$

$$2 = a(-1) + b$$

$$\begin{bmatrix} 6 & 0 \\ 0 & 6 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

$$1 = a(2) + b$$

$$\begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix} = a \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix} + b$$

$$A^T Ax = A^T b$$

what's A? what's b?

$$\begin{bmatrix} 2 & -1 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix}$$

$$B = \begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix} \begin{bmatrix} 2 & -1 & 1 \end{bmatrix}$$

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$$2 + 1 + 2$$

$$5x = -1$$

$$0 - 2 + 1$$

$$x = -\frac{1}{5}$$

$$f(x) = -\frac{1}{5}x + \frac{1}{5}$$