

(3)

□ Solution to normal equations:

$$\tilde{b}^{(1)} = \begin{bmatrix} 14 \\ 1 \\ 13 \\ -2 \end{bmatrix} \begin{matrix} \rightarrow \mu \\ \rightarrow \alpha_1 \\ \rightarrow \alpha_2 \\ \rightarrow \alpha_3 \end{matrix}$$

$$\tilde{b}^{(2)} = \begin{bmatrix} 1513.5 \\ -1504.5 \\ -1492.5 \\ -1507.5 \end{bmatrix} \begin{matrix} \rightarrow \text{intercept} \\ \rightarrow \text{effect of Al} \\ \rightarrow \text{effect of Li} \\ \rightarrow \text{effect of Si} \end{matrix}$$

→ Components are different

→ But some elements (functions of components) stay the same

$$\text{Example } \alpha_1 - \alpha_2 : 1 - 13 = -12 \quad \left. \begin{matrix} \tilde{b}^{(1)} \\ \tilde{b}^{(2)} \end{matrix} \right\} \begin{matrix} -1504.5 + 1492.5 \\ = -12 \end{matrix}$$

□ Write  $\alpha_1 - \alpha_2$  as linear function (weighted sum) of

$$\text{solution } \tilde{b}^{(0)} = \begin{bmatrix} \mu \\ \alpha_1 \\ \alpha_2 \\ \alpha_3 \end{bmatrix}$$

$$: \underbrace{[0 \ 1 \ -1 \ 0]}_{q^T} \underbrace{\begin{bmatrix} \mu \\ \alpha_1 \\ \alpha_2 \\ \alpha_3 \end{bmatrix}}_{\tilde{b}^{(0)}} = \alpha_1 - \alpha_2$$

$q^T \tilde{b}^{(0)}$  is an estimable function of  $\tilde{b}^{(0)}$