In Regression: $\hat{b} = (X^T X)^{-1} X^T y$

$$E(\hat{b}) = E\left((X^T X)^{-1} X^T y\right) = (X^T X)^{-1} X^T \cdot \underbrace{E(y)}_{Xb}$$

$$= (X^T X)^{-1} X^T X b = b$$

Solution : Estimable Function

solution vectors:

$$b^{(0)} = \begin{bmatrix} \mu^0 \\ \alpha_1^0 \\ \alpha_2^0 \\ \alpha_3^0 \end{bmatrix} ; \quad b^{(1)} = \begin{bmatrix} \mu^1 \\ \alpha_1^1 \\ \alpha_2^1 \\ \alpha_3^1 \end{bmatrix} ; \quad b^{(2)} \ldots$$

- Not looking at individual components of solution vectors $b^{(j)}$; but at linear functions of components:

$$l_1 \cdot \mu^{(j)} + l_2 \cdot \alpha_1^{(j)} + l_3 \, \alpha_2^{(j)} + l_4 \, \alpha_3^{(j)}$$

(1): $\alpha_1^{(j)} - \alpha_2^{(j)}$

$$\Rightarrow 0 \cdot \mu^{(j)} + 1 \cdot \alpha_1^{(j)} + (-1) \cdot \alpha_2^{(j)} + 0 \cdot \alpha_3^{(j)}$$