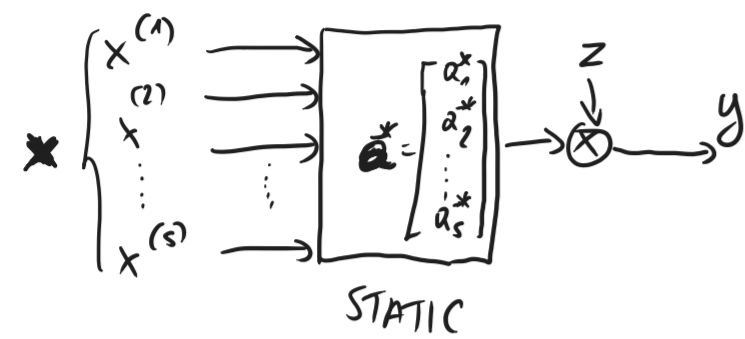


LEAST SQUARES METHOD



* ← true, unknown

MISO
STATIC
SYSTEM

OUR
KNOWLEDGE

(P) $y = F^*(x, a^*) + z$

(N) $\{(x_k, y_k)\}_{k=1}^N$

WE KNOW THE (SHAPE OF)
FORMULA $F(x, a)$
CLASS OF MODEL UNKNOWN

GAUSS 1809

THEN $Q(a) = E_m (y - \bar{y}(a))^2 = \int \dots f(\dots)$

WE DO NOT
KNOW $f(\dots)$

$\hat{Q}(a) = \frac{1}{N} \sum_{k=1}^N (y_k - \bar{y}_k(a))^2 = \frac{1}{N} \sum_{k=1}^N (F^*(x_k, a^*) + z_k - F^*(x_k, a))^2$

FOR $a = a^* \rightarrow Q(a^*) = E z^2 = \text{var} z$ MINIMAL (BEST) POSSIBLE

$\hat{Q}(a) \rightarrow \min_a$

$\arg \min_a Q(a) = a^*$

$x_k \sim \text{i.i.d}$

