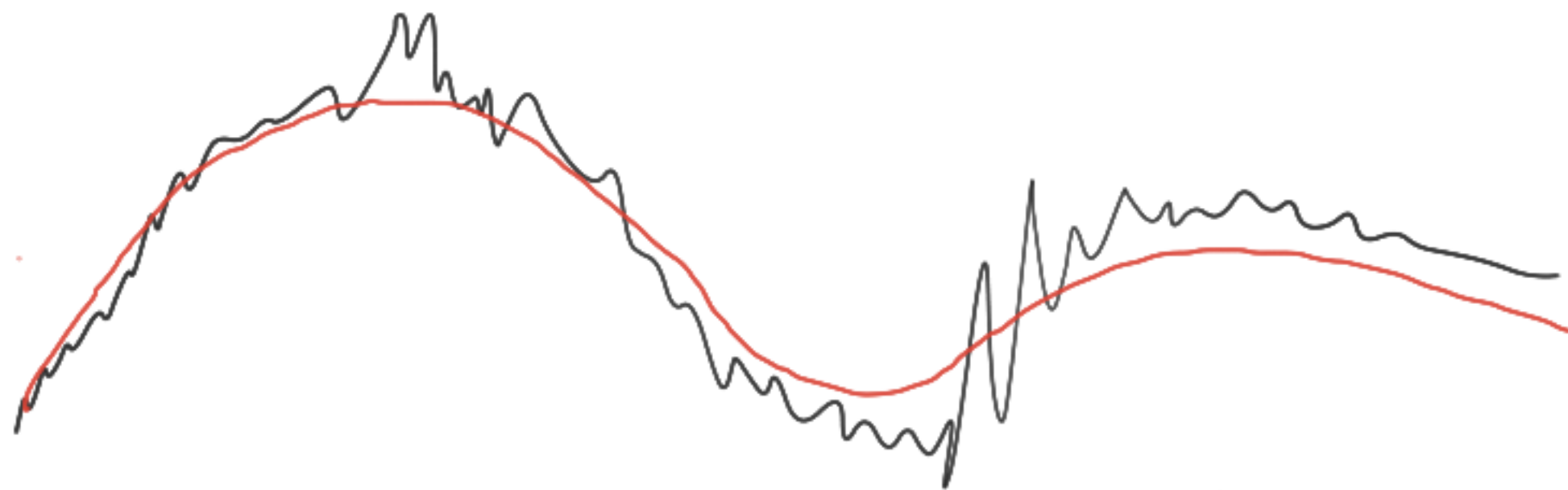


$1/\tau$



$$y_t = X_t + \mu_t$$

$k=17$



$\mu_t$



$$\mu_t = a_0 + a_1 t + a_2 t^2 + \dots + a_k t^k$$

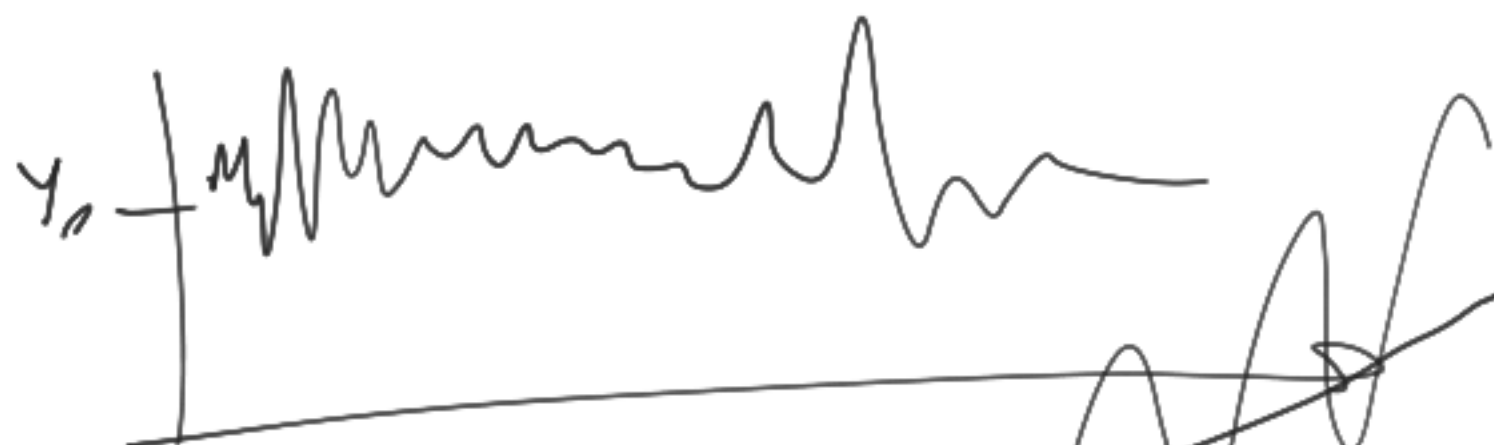
$X_t$



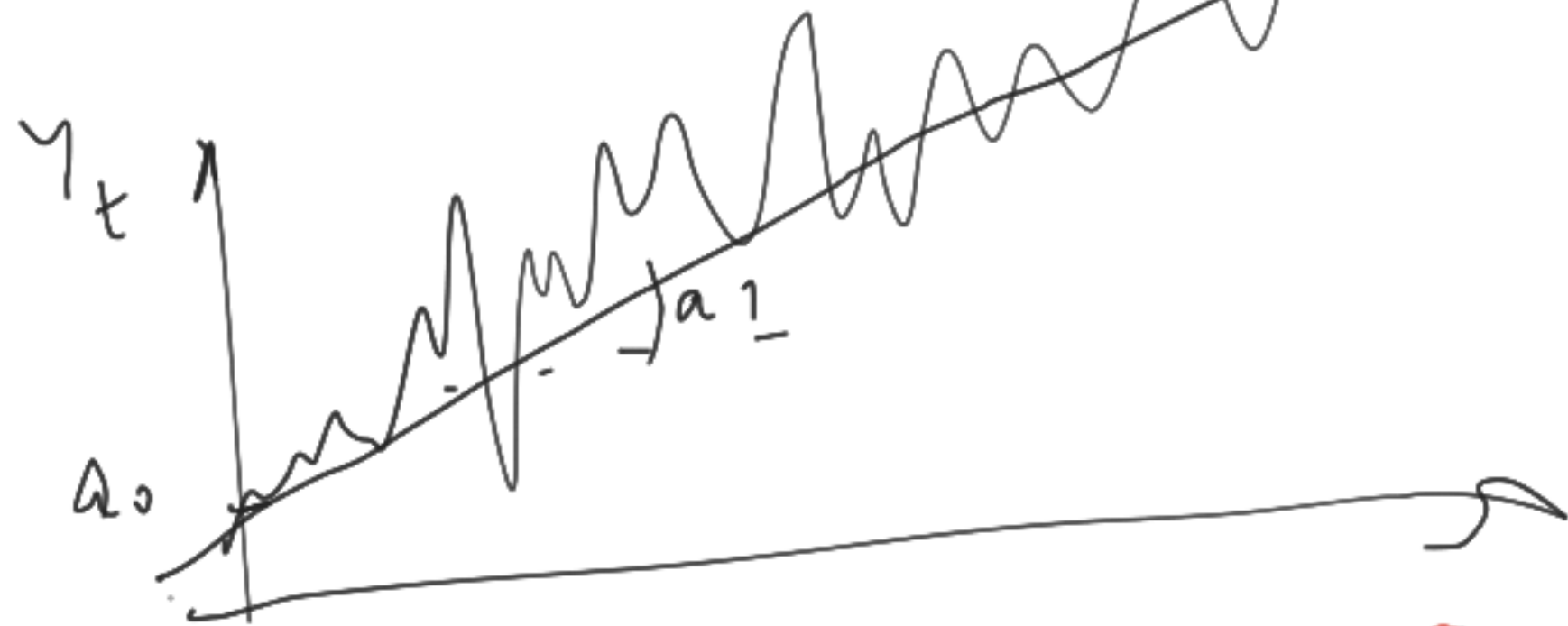
Linear



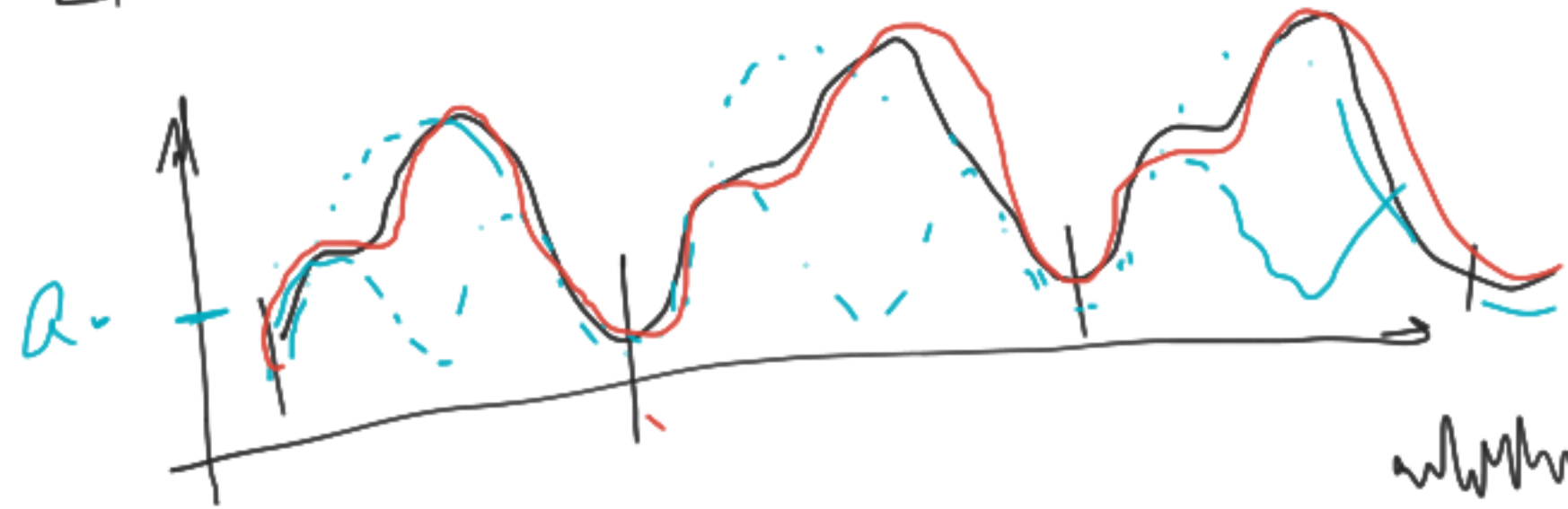
$$\mu_t = y_0$$



$$\mu_t = a_0 + a_1 t$$

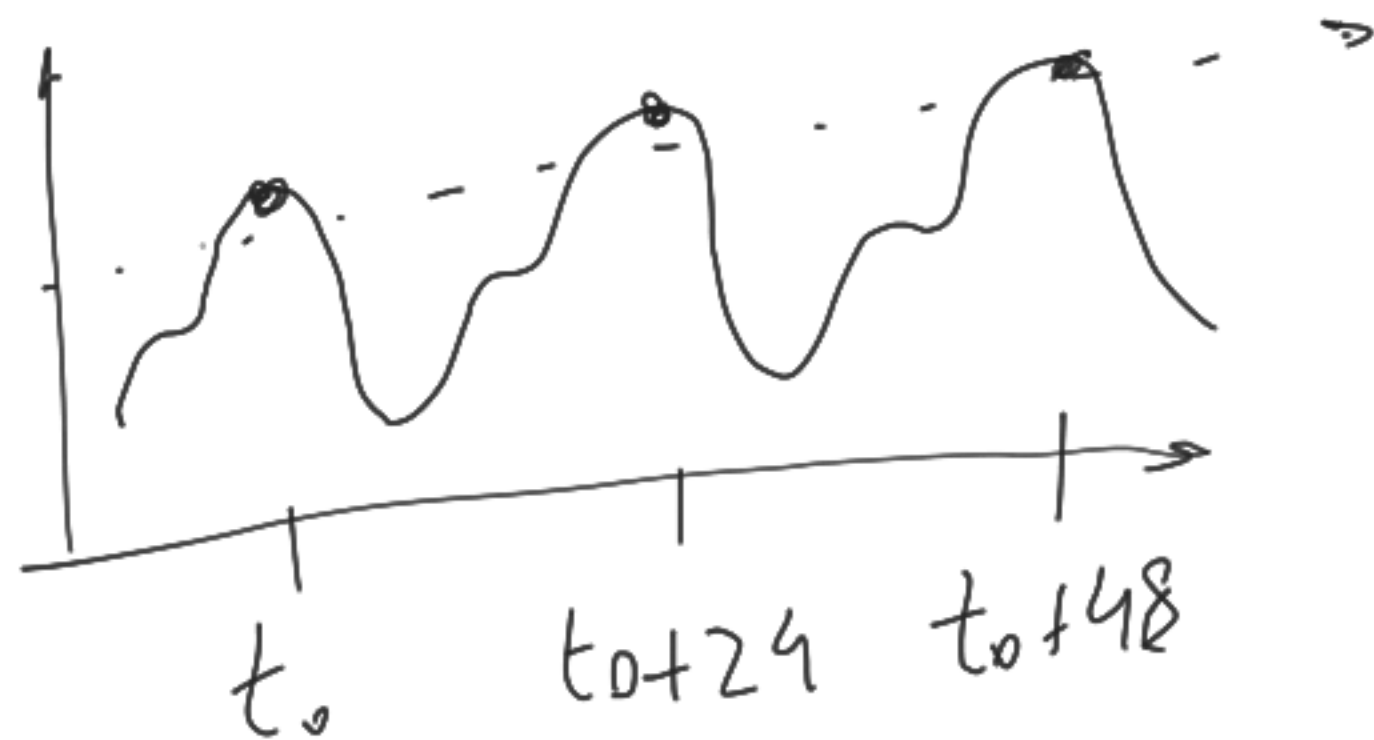


$$y_t = x_t + \mu_t$$



$$\mu_t = a_0 + a_1 \cos(\omega_1 t) + a_2 \cos(\omega_2 t)$$

$$\mu_t = a_0 + a_1 \cos(\omega_1 t) + a_2 \cos(\omega_2 t)$$

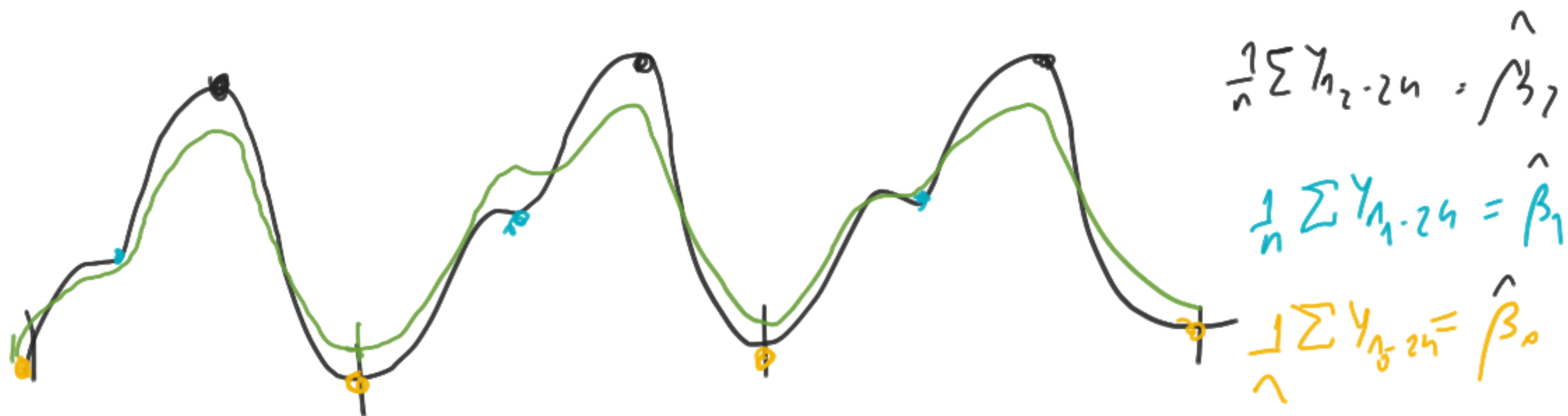


$$\hat{y}_t = X_t + \mu_t$$

$$\mu_t = a_0 + a_1 t$$



$$y_t = y_{t-24}$$



$$\beta = [\hat{\beta}_0 \quad \hat{\beta}_1 \quad \hat{\beta}_2 \quad \dots \quad \hat{\beta}_{24}]$$

$$\begin{aligned}
 E[Y_t] &= E[e_t + a_1 e_{t-1} + a_2 e_{t-2} + \dots] \\
 &= \underbrace{E[e_t]}_0 + a_1 \underbrace{E[e_{t-1}]}_0 + a_2 E[e_{t-2}] + \dots = 0
 \end{aligned}$$

$$\begin{aligned}
 \text{Cov}(Y_t, Y_{t-2}) &: \text{Cov}(e_t + a_1 e_{t-1} + \underbrace{a_2 e_{t-2}}_{\substack{\uparrow \\ a_3 e_{t-3}}}, \underbrace{e_{t-2}}_{\substack{\uparrow \\ a_1 e_{t-3}}} + \underbrace{a_1 e_{t-3}}_{\substack{\uparrow \\ a_2 e_{t-4}}} + \dots) \\
 &= \sum_k \text{Cov}(a_{k+2} e_{t-k}, \underbrace{a_k e_{t-k}}_{\substack{\uparrow \\ a_{k+1} e_{t-k-1}}})
 \end{aligned}$$

$$\begin{aligned}
 &= \sum_{k=0}^{\infty} \text{Cov}(a_{k+2} e_{t-k}, a_k e_{t-k}) \\
 &= \sum_{k=0}^{\infty} a_{k+2} \cdot a_k \sigma_e^2
 \end{aligned}$$

