

$$\Xi^t := \sum_{k=1}^K \frac{\omega_k}{\tau_k} \sum_{q=1}^{\tau_k} \mathbb{E} \left[\left| \theta^t - \theta_k^{t,q-1} \right|^2 \right],$$

$$\Pi^t := \sum_{k=1}^K \frac{\omega_k}{\tau_k} \sum_{q=1}^{\tau_k} \mathbb{E} \left[\left| \theta^t - \theta_k^{t-1,q-1} \right|^2 \right].$$