Notes for Autonomous Robotic Networks

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1 Distributed Estimation

We will talk about distributed Least Squares and Distributed Kalman Filtering. Let $\theta \in \mathbb{R}^q$ be the variable we are trying to estimate, and that our measurement is

$$z = H + v$$

represents our corrupted measurements. $H \in \mathbb{R}^{pq}$, $p > q$. We then define

$$J(\theta) = (z - H\theta)^T (z - H\theta)$$

such that if $\hat{\theta}$ is the predicted measurement and z is the actual measurement, $J()$ is minimized. From this, we can see that

$$\hat{\theta} = (H^T H)^{-1} H^T z$$