SSY345 - Sensor fusion

Lecture: 2

Bayes' rule

$$p(\theta|y) = \frac{p(y|\theta)p(\theta)}{p(y)}$$

where: $p(y|\theta)p(\theta) = p(\theta|y)p(y)$ is conditional probability.

and $p(y) = \int_\theta p(y|\theta)p(\theta)\,d\theta$.

Likelihood

$$l(\theta|y) = p(y|\theta)$$

Posterior

$$p(\theta|y) = \frac{p(y|\theta)p(\theta)}{p(y)} \propto l(\theta|y)p(\theta)$$

Optimal Bayesian decisions

$$\hat{\theta} = \arg\min_a \mathbb{E}\{C(\theta,a)|y\}$$

where $\mathbb{E}\{C(\theta,a)|y\} = \int_\theta C(\theta,a)p(\theta|y)\,d\theta$

Posterior and loss gives decisions

$$\hat{\theta} = \arg\min_a \int_\theta C(\theta,a|p(\theta|y)\,d\theta$$