

Prior

Classic Bayes

$$\boldsymbol{\theta} \sim \pi(\boldsymbol{\theta})$$

Likelihood

$$Y \sim F(\boldsymbol{\theta})$$

Example

$$\begin{aligned}\boldsymbol{\theta} &= (\mu, \sigma^2) \\ Y &\sim \mathcal{N}(\mu, \sigma^2)\end{aligned}$$

Bayesian Inverse
Problem

$$\begin{array}{c} \boldsymbol{u} \sim \pi(\boldsymbol{u}) \rightarrow m(\cdot) \rightarrow \boldsymbol{\theta} \\ \uparrow \\ X \end{array}$$

$$Y(X) \sim F(\boldsymbol{\theta})$$

$$\begin{aligned}\boldsymbol{\theta} &= (\mu(X), \Sigma(X)) \\ Y(X) &\sim \mathcal{N}_n(\mu, \Sigma)\end{aligned}$$