

Stat Model

Bayesian Estimator(BME)

The Bayes estimator is the expected value of the posterior

$$\rho_{\text{BME}} = \mathbb{E}[\rho|\text{Data}]$$

$$\hat{\rho} = \int \rho \Pr(\rho|\text{Data}) d\rho$$

$$\hat{\rho} = \int \rho \frac{\Pr(\text{Data}|\rho)\Pr(\rho)}{\Pr(\text{Data})} d\rho$$

We only care about an estimator that is proportional to the density matrix since we can normalize the matrix at the end.

$$\hat{\rho} \propto \int \rho \Pr(\text{Data}|\rho) \Pr(\rho) d\rho$$

Monte Carlo Estimator

$$\hat{\rho}_{\text{BME}} = \mathbb{E}[\rho|\text{Data}]$$

- $\rho_i \sim \Pr(\rho)$ is a random sample from the prior

$$\hat{\rho}_{\text{BME}} = \sum_i \rho_i \Pr(\text{Data}|\rho)$$