

BUQ Project Discussion - Use posterior distributions effectively

Hendrik Roch
Wayne State University
02.10.2024

How do we make effective use of posterior distributions?

1. Use the MAP parameter set
 - Pros: Just one full model simulation needed
 - Cons: Does not really make use of the full variability of the posterior distribution
2. Sample from the posterior distribution + run multiple $\mathcal{O}(10 - 100)$ simulations; average + compute standard deviation
 - Pros: Can give a mean and error band in addition
 - Cons: Full model simulations might be too expensive, at least for some users (some high-statistics observables might not be possible to compute with this)
3. Sample from posterior distribution + run multiple small number of events per sample; weighted average with likelihood
 - Pros: Less expensive than method 2
 - Cons: Error band extraction more complicated/impossible (statistical + model fluctuations entangled)

Example of method 2 from

Syed Afrid Jahan, HR, Chun Shen, arXiv:2408.00537

