

ADVANCED BAYESIAN MODELING

Rejection Sampling

Conditions

Assume we can evaluate unnormalized continuous posterior density

$$q(\theta) \propto p(\theta \mid y)$$

but can't sample from posterior directly.

Assume there exists known function $g(\theta)$ that

- ▶ Is proportional to a continuous density that is easy to sample
- ▶ Satisfies $q(\theta) \leq M g(\theta)$ everywhere, for a known M

Rejection Sampling Algorithm

1. Sample θ^* from the density proportional to $g(\theta)$.
2. With probability $q(\theta^*)/(M g(\theta^*))$, *accept* θ^* , appending it to the simulation sample. Otherwise continue.
3. Repeat until S samples have been accepted.

If sampling in Step 1 is independent, then final sample will be independent.

Drawback: Apparently requires preliminary analysis to choose g and M .

Can be inefficient if poorly chosen.

Solution: Can be made adaptive (at expense of extra computation).