Conclusion

Essential concepts

1. **Bayesian modeling**:

$$\theta \sim \pi(\theta) \quad \text{the } \textit{prior}$$

$$Y_i|\theta \overset{iid}{\sim} f(y|\theta) \quad \text{sampling model}$$

2. **Bayes' formula**: $p(\theta|\mathbf{y}) = \dfrac{f(\mathbf{y}|\theta)\pi(\theta)}{f(\mathbf{y})}$

   with $p(\theta|\mathbf{y})$ the *posterior*, $f(\mathbf{y}|\theta)$ the likelihood (inherited from the sampling model), $\pi(\theta)$ the *prior* and $f(\mathbf{y}) = \int f(\mathbf{y}|\theta)\pi(\theta)$ is the marginal distribution of the data, i.e. the normalizing constant (with respect to θ)

3. **The *posterior* distribution is given by**:

$$p(\theta|\mathbf{y}) \propto f(\mathbf{y}|\theta)\pi(\theta)$$

4. ***Posterior* mean, MAP, and credibility intervals**

Practical use

The Bayesian framework is (just) another statistical tool for data analysis

Particularly **useful when:**

- few observations only are available
- there is important knowledge *a priori*

Like any statistical method, Bayesian analysis has advantages and disadvantages that will be more or less important depending on the application considered.

Questions ?