

Pre-class preparation

Please read the following textbook sections from Degroot and Schervish's *Probability and Statistics* (fourth edition) or watch the video, as indicated:

- Textbook: 7.3

Objectives

By the end of the day's class, students should be able to do the following:

- State the definition of a conjugate family of prior distributions, and provide examples of a few conjugate priors.
- Identify whether a particular distribution is a conjugate prior for a given likelihood function.
- Explain in non-technical terms what is meant by an “improper prior”.

Reflection Questions

Please submit your answers to the following questions to the corresponding Canvas assignment by 8:45AM:

1. We have learned that the Beta distribution is a conjugate family of priors for data arising from a Bernoulli(θ) distribution. Now suppose that $X_1, \dots, X_n | \theta \stackrel{\text{iid}}{\sim} \text{Binom}(m, \theta)$, where m is the number of trials (fixed and known) in each of the n Binomial samples, and θ is the unknown probability of success in each trial. Show that the Beta(α, β) distribution is a conjugate prior for data arising from the Binomial distribution.
2. True or false? A conjugate prior will never be an improper prior.
3. (Optional) Is there anything from the pre-class preparation that you have questions about? What topics would you like some more clarification on?