

Another Quick Summary of Recent Problem Sets

Due to

(a) my misnumbering of two problem sets

(b) skipping chapters 12 and 14 of Donovan and Mickey, and

(c) substituting my “Why Do They Work” write-ups for the theory in Donovan and Mickey Chapters 13, 15, and 16,

I think we could all use the help keeping it all straight with this summary of what all the problem sets covered since Exam 2.

Bayesian Conjugates

Problem Set 14, Nov. 19

This problem set used the field goal kicker to illustrate what Donovan and Mickey covered in Chapter 10. That was beta distribution priors being conjugate to binomial likelihoods.

Problem Set 15 (was originally misnumbered as Problem Set 14) Nov. 22

This problem set used mug breakage to illustrate what Donovan and Mickey covered in Chapter 11. That was gamma distribution priors being conjugate to Poisson likelihoods.

NOTE: I did some advanced stuff corresponding to Chapter 12 for those who might want that challenge, but there was no problem set on Chapter 12, and I don't expect you to know anything about it. To do Chapter 12 properly requires a multi-dimensional continuum of probability distributions.

Monte Carlo

Problem Set 16 (was originally misnumbered as Problem Set 15) Nov. 26

This problem set illustrated the **Metropolis** Monte Carlo method using iPhone Quarterly sales. The theory was in my “Monte Carlo Methods - Why Do They Work?” and in Donovan and Mickey Chapter 13. Something unrealistic was that the iPhone sales wrapped. (Q1 was “to the right” of Q4.) This was because Metropolis can't handle asymmetric proposed movement rules.

Problem Set 17, Dec. 6

This problem set illustrated the **Metropolis-Hastings** Monte Carlo method again using the iPhone Quarterly sales, but this time the edges of the distribution didn't wrap around (Q1 was not “to the right” of Q4). The theory was in my “Monte Carlo Methods - Why Do They Work? - Part II” and in Donovan and Mickey Chapter 15. We completed the problem set in class, and discovered that everyone using the same die rolls wasn't random enough and skewed the quarterly distribution to the left.

Problem Set 18, Dec. 10

This problem set illustrated **Gibbs Sampling** using a 2x3 matrix (rock-potato on one axis, and small-medium-large on the other axis). The theory was in “Monte Carlo Methods - Why Do They Work? - Part III” and in Donovan and Mickey Chapter 16. We did this problem set as an in-class exercise.