Homework 9

klin@math.arizona.edu

April 9, 2020
Due Tuesday 4/14 at 11:59p on Gradescope

Graded problems

- Exercise 2.4, 2.5, 2.7, 2.15, 2.18 from the text[1]

Suggested problems Exercises 2.1, 2.2, 2.3, 2.8, 2,11, 2.12, 2.14, 2.17

[1] Hints on the next page, for anyone who wants them.

Hints for people who want them

- 2.4: let T_i denote the waiting time to the first fish for the ith person. The problem is asking about the maximum of the T_i. The problem is vague about what it expects as an answer; I'm satisified if you can find the PDF of the time to all 3 people catching at least one fish. This can be found via the CDF.

  The above can be used to compute the expected time for all 3 people to catch at least one fish, but there's a slicker way: see Example 2.1(b).

- 2.5: Part (a) really involves 3 (independent) random variables: time for Ilan to do Problem 1, time for Ilan to do Problem 2, and time for Justin to do Problem 3. In (a), you will need to know the PDF of the sum of two independent random variables S and T. This can be found by the convolution

  $$f_{S+T}(u) = \int_0^u f_T(u-s)\, f_S(s)\, ds. \tag{1}$$

  For exponential distributions with different rates, this integral is straightforwrad.

  For (b), my earlier hint was misplaced. Instead, think about the distribution of the maximum of two waiting times. You can leave the expectation in the form of an integral for this problem.

- 2.7: For (b), see Example 2.1(b) for a slick way to solve problems of this type.
- 2.15: remember linearity of expectations! this makes the problem a lot easier.
- 2.18: this only requires basic properties of the Poisson process and the Poisson distribution.