STAT 215A Quiz #3, Spring 2022

Instructions. This quiz consists of two parts. The timed (in-class) portion consists of one problem with a few parts. It is due by 5:20 pm today (submission via Canvas, as usual). This part needs to be completed and submitted individually (no collaboration). Similarly, the take-home portion consists of one question (with a bonus problem). It is due by 2 pm tomorrow (Friday) via Canvas Assignments. You are allowed to discuss solution ideas with your classmates for the take-home portion but the final document should be your own (so don't copy any part of it from another classmate) and it should be submitted individually. Note that your score from the take-home portion (including the extra credit part) will also count as your score for the last HW. If you notice any mistakes or if any part of a question is not clear to you, please let me know.

In-Class Part. Let X and Y be jointly discrete random variables on a probability space $(\Omega, \mathcal{F}, \mathbb{P})$, with the following joint pmf: $p(x,y) = p_{X,Y}(x,y) = C\frac{x^y}{y!}$, for $x = 1,2,3,4$ and $y = 0,1,2$, where C is a positive constant that makes $p(x,y)$ a valid joint pmf.

(a) (1.5 pts) Determine the marginal pmf of Y. It is fine for the result to depend on C.

(b) (1.5 pts) Given that $Y = 1$ is observed, determine the conditional pmf of X.

(c) (1 pt) Compute $P(X > 2|Y = 1)$.

(d) (1 pt) Compute the conditional expectation, $E[X|Y = 1]$.

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Take-Home Portion of Quiz#3. This item (along with the extra credit/ bonus part) is due by 2 pm on Friday, May 6. Your score also counts as the score for HW#5.

HW#5. (2 pts.) Consider again the problem given above. Do one of the following:

Option A. Determine the correlation between X and Y.

Option B. Determine the pmf of $W = X + Y$.

Bonus. (1 pt) Determine the constant C of the joint pmf (given in the timed portion).