Q1.

1. Let N be the number of students in the same seat for both classes. Let Ej be the event that the jth student sits in the same seat in both classes. Then

By symmetry, inclusion-exclusion gives,

The j-term intersection event represents j particular students sitting pat through-out the two lectures, which occurs with probability . So,

1. Define to be the indicator for student having the same seat in both courses, so that . Then,, and the are weakly dependent because,

So, N is close to in the distribution, where we recongnize as the Taylor series for

Evaluated as x = -1

1. Using Poisson approximation, we have

Q2.

The seat for the last passenger is either seat 1 or seat 100; for example, seat 42 can’t be available to the last passenger since the 42nd passenger in line would have sat there if possible. Seat 1 and Seat 100 are equally likely to be available to the last passenger, since the previous 99 passengers view these two seats symmetrically. So, the probability that the last passenger gets seat 100 is ½.