

STAT 380 Lecture 6  
Spring 2019  
16 January 2019

- On Wednesday 23 January Boyi will lecture; that material will be on exams.
- Assignment 2 is now posted. A number of students are away this weekend from Thursday to Sunday I believe so I am going to move the due date from Friday to the next Wednesday, the 23rd in the drop box by 3 PM. HOWEVER: Assignment 3 may have a due date which is quite quick after that: 28 January. This is yet to be decided firmly.
- I finished off the discussion of slides 1 to 8 of the Lions Gate Bridge material. You should read the rest of those slides but I won't talk more about them until we get to Poisson processes.
- In that discussion you need to learn about:
  - Computing pgfs for integer valued random variables.
  - Differentiating a pgf to find the mean of random variable taking values in the set of non-negative integers.
  - Computing probabilities of events by writing them in terms of other variables – usually the variables about which you have made assumptions.
  - Survival functions, cumulative distribution functions, probability mass functions and how to move from 1 to another of these for discrete data.
- Then I introduced the concept of a Markov Chain  $X_t$  for  $t = 0, 1, \dots$ . I am working on the slides called “Markov Chains” and have done only slide 3 and part of slide 4
- The set  $S$  of possible values of  $X_t$  is called the *state space*. It is the same set for all  $t$ .
- The process is *Markov* or *has the Markov Property* if, for every  $n$  and for every  $i$  and  $j$  belonging to  $S$  and for every event  $A$  defined in terms of  $X_0, \dots, X_n$  we have

$$P(X_{n+1} = j \mid X_n = i, A) = P(X_{n+1} = j \mid X_n = i)$$

- I called  $\{X_t, t = 0, 1, \dots\}$  a *stochastic process*.
- Handwritten slides are [here](#).