Meetings 1-4

See meetings1to4.pdf

Meeting 5

Noted in Logbook

6th meeting

Questions:

* Copying notation?
  + Not that important, choose stick with one
* Homogeneity definition in my latex document only for discrete time markov chain?
  + In terms of h for all h
* is ‘text’ the right word?
  + It is
* use Lancaster Uni course codes?
  + You could
* Writing style of (Statement 1) => (Statement 2) good or bad?
  + Better to use words
* Discrete / continuous vs countable / uncountable, vs \mathbb{N} / \mathbb{R}
  + Change markov chain definitions
* Send him document on Tues/Wed
  + Def/thrm bold, keywords italics

7th meeting

Questions:

* When writing in text, and using $ . $ for mathematical expressions, how can I force latex keep the mathematical expression on a single line?
  + Can’t. Use a math line. $$ . $$ easier than \begin{equation\*} . \end{equation\*} btw
* For proofs: is there a better way to explain rationale of how we go from line X to line X+1?
  + No. Just use separate align functions and write in-line text between them.
* How to have a single numbering system for defs, theorems, lemmas, etc.
  + \newtheorem

Comments:

* Definition 1.2, put long equation in equation line.
* Also for def 1.2, add for all t, for all X0, …, Xt.
* Finally, for def 1.2 Markov property varies between Markov processes, Markov chains and discrete Markov chains; make the distinction!
* Fix definition 1.7 probabilities aren’t statements
* Move for all homogeneous equations to the front (below def 1.7)
* Fix typo in footnote
* Typo: double, “the”
* Typo: “Kolmogoron”
* Make title

8th meeting

* Is it okay for two definitions to depend on each other?
  + No. In the first definition, describe the second definition without saying it by name and later define the second definition after we already have the first.
* Markov property for Markov processes in Wikipedia seems way out of scope of what I’m planning on covering; is it okay to not define it?
  + For now, yes, probably will get around to it later.
* Go over new sections and mention what I’ve changed; ask if it’s okay.
  + Mostly yes.
* Is the example okay?
  + No, need to give a particular Markov Chain which leads to my example; use his second example.
* Is it okay to define random variables in terms of conditional probabilities?
  + Not preferred.

9th meeting

* Bibliography – should I be doing anything in particular right now
  + Reference proofs taken from books or theorems which are unproven and stated in books.
* Logbook – check to see if it’s going well
  + He mentioned he hasn’t looked at too many of his students’ logbooks, but gave what insight he had on the following questions:
* How lengthy?
  + Not too lengthy.
* How mathematical should it be?
  + Given that it shouldn’t be too lengthy, it probably needn’t be too mathematical either.
* Stirling’s formula
  + Just cite it; well-known result of combinatorics.
* Is ‘recurrent chain’ equivalent to a Markov chain, all of whose states are recurrent, and, ‘transient chain’ otherwise?
  + Yes.
* Generating functions seem to not be necessary for the proof of Polya’s theorem, is it still a good idea to introduce them?
  + Generating functions actually are used in proof of Polya’s theorem. In general though, it’s hard to say if topic X should be introduced if though it’s not required for a proof; just get to writing and it will become obvious.
* Sometimes when the author says, ‘walk’, he means a 1-dimensional walk, and sometimes he specifies that its N-dimensional; how should I treat the word, ‘walk’ in my dissertation, precisely?
  + The author is not being ambiguous because the sections are named with respect to the walk, and what dimension it is in.
* Typo in the proof of Polya’s theorem?
  + Yes.

10th meeting

* Proving Polya’s theorem for processes in general; where to get a proof should I do it in my dissertation?
  + We will decide later when we have a better idea of what the dissertation will look like.
* Struggled with finding relevant example for, “we can still have mu\_i infinite when i is recurrent”.
  + Didn’t get around to asking Prof. Korshunov this question.
* Borovkov Prob. Theory, Def. 7.1.3 what letter is used?
  + “z”, with strange font.
* In proof of 13.2.1, Borovkov, shouldn’t f\_1(1) read f\_j(1)? Typo?
  + Yes.
* In proof of 13.2.1, Borovkov, shouldn’t denominator be “1 – F\_j(z)”?
  + Yes.
* Definition of generating function? Do we require that series converges? If yes, what about when variable is complex? Do we require absolute convergence in that case?
  + Since I only mention generating function, the generating function with z real is enough; then I can restrict z to be such that the generating function converges.

11th meeting

Reviewed screenshots

12th meeting

* More examples in general? Random walks as examples? Computer simulations?
  + Delayed recurrent walk barrier at 0
  + Expected time of return to 0 after application.
* Is it okay to say that for a Markov chain, the indexing set $T = \mathbb{Z}\_+$? Prior to now I made the more general statement that $T \cong T\_{\*} \subset \mathbb{Z}\_{+}$, but it’s become a bit of a thorn in my side since.
  + Indexing set is not a problem.
  + Change state space from being isomorphic to R since we consider d dimensions too. Borel space.
  + Define chains generally, but say that we are working on chains with particular state space outside of definition.
* Def 2.2.10: in Stirzaker's book, the definition doesn't require that the state be recurrent, but I think the definition only makes sense in that case.
  + Nope, remove recurrence condition.
* Is Lemma 2.3.2 worth stating/proving?
  + Worth it
  + For proof: don’t start it with formula, say “The relation”, for example.
* Am I writing proofs out too much?
  + We will think about this at the end when assessing length of document.
* Should I call Polya’s theorem a corolloary? Maybe call the prior theorem a lemma and call Polya a theorem?
  + Not a problem
* How to reference entire paragraph?
  + Use remark
* Typo on Brovkov pg. 397, equation (13.2.2), middle term should be jj.
  + Yes.

13th meeting

* Borovkov proof of Polya is for a different definition of a walk than the standard?
  + yes
* Can I use alternative proof?
  + yes

14th meeting

* Examples of null recurrent chains
  + Walks in 1 and 2 dimensions, but hard to prove null recurrence…
* Real life applications of polya
  + hard to find

15th meeting

* Is my proof of null recurrence for 1-d walk good? (Corollary 2.5.6)
  + yes
* Is my vague example 2.2.8 sufficient?
  + Use constant c and write c/n as opposed to 1/n
* Should I write out proof for Lemma 2.5.7?
  + As you decide
* Should I reference source to multinomials information?
  + Yes, book preferably
* Do I need to justify that max value of a multinomial is when all values in second entry are as close to each other?
  + Either prove, or state with reference
* Only reference the Chu–Vandermonde identity without proof? (should I show the implication from the identity to the result I require, or straight up write out the result I need without proof?)
  + As you decide
* Should I provide resource where it’s proved? Is Wikipedia as a source a problem?
  + Wikiepdia source is problem, provide resource.
* Is that identity a deep result of combinatorics or a basic one?
  + Basic
* The Chu-Vandermonde identity is for all complex number n,m; should I say that or just the +ve integers to avoid confusion?
  + Not needed, since complex numbers are not used; footnote
* I have 3 distinct combinatorics results relating to 2 different subsections of my dissertation. Group them under a subsection and refer to them from wherever needed, or state them right before the result they relate to?
  + Section/appendix

Extra comments:

* Get rid of \cancel{} everywhere.
* Presentation:
  + Go over results
  + Decide on a title and inform the presentation from the title

16th meeting

* How bad is it if I don’t prove Thm 2.2.9. ? If I go to prove it, should I find an extra source for the sake of diversity?
  + Could reference, not bad to prove
* 7 sources, 3 instances where I’ve proved something myself.
  + No need to source things I proved myself
  + Good to diversify.
* Format of Michael Kozdron paper bad?
  + Not really. Find hyperlink
* I am planning to source anything I haven’t proven. (e.g. Stirling’s formula)
  + Perhaps use Erich Kamke books as source for Stirling.
* One proof of Polya statement (Legrand Jones II) has an oversight, which slightly invalidates the proof – any point in discussing this, anything to gain from spotting this mistake?
  + Ignore the mistake, find hyperlink though
* Pg22 main equation, good notation?
  + yes
* External links to animations/ large collages of graphics?
  + Borderline case
* Will adding graphics (so far have none) contribute to the dissertation?
  + Always nice to have
* \textwidth command doesn’t seem to work.
  + Use template
* 42 lines per page
  + Use template

17th meeting

* Cauchy condensation; is it basic, should I provide resource, should I state it as a lemma?
  + reference
* Closed form of geometric series; is it a basic result requiring no justification?
  + yes
* Long lines of equations (in Polya’s proof, last pages-ish)
  + Not needed to split.
* Is it okay to directly show cases 0,1 but say similarly for 2?
  + Completely wrong approach, big mistake - fix Polya proof for 3D.
* Summation at end of page 29.
  + Completely wrong approach, big mistake - fix Polya proof for 3D.
* Cases beyond 3 dimensions
  + Argue 3 dimensions is transient and strict subset of n>3 dimensions, hence they’re transient too.

18th meeting

* Does the summation of Stirling’s approximations of an expression tend to 0 if and only if the summation of the expressions itself tend to 0?
  + If ratio tends to 1 then yes.
* How crucial are bracket sizes? \left, \right
  + \left, \right is okay
* Is notation in %ABC123 footnote good?
  + Yes.
* Page numbers of cited books? General way I refer to citations good? Used different pages of the same book across dissertation; how exactly to reference?
  + Change wording around slightly.
* Citation of Chu-Vandermonde dilemmas; Jaiswal vs old French paper
  + Find a text book.
* Prove law of total probability?
  + No.
* Prove definition of conditional probability (bottom of page 5)?
  + No.
* Need to justify going to eqn 2.1 from previous line?
  + No.

Screenshot review.

* Can I have contents on its own page?
  + Yes.
* Un-split Theorems/proofs across pages? E.g. Example 2.9., Example 2.14., proof of Theorem 4.2., and proof of Lemma 3.2, Example 3.5., proof of Corollary 6.5 more contentious
  + No. Only perhaps for appendix.

Extra comments:

* Try to reference Polya’s original paper.

19th meeting

* Latex typesetting: using a/b instead of \frac{a}{b} for fraction? (pg.22)
  + Shouldn’t use this. Maybe say “ratio of $a$ and $b$” if in text.
* Referencing: term, “incollection” in bibtex file?
  + It is a book
* Referencing: term, “inproceedings” in bibtex file?
  + It is a book
* Referencing: see Aigner, M. citation; bibtex entry written by me, taken from MATH 327, looks slightly different there
  + Type is book, not article
* Referencing: Couldn’t find Polya result
  + Found a reference to a letter he wrote in a Biography of him, where his theorem appeared.
* Referencing: For Kozdron: Should I capitalize Polya?
  + Yes, seems like a mistake.