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This project will give you an opportunity to explore applications of stochastic processes in a field of interest to you (possibly your major), while gaining some practice in reading the literature and in scientific writing.

Find an article in a peer-reviewed journal in your area of interest which uses a stochastic process as a model for some "real-life" behavior. Write a review giving a summary and critique of the approach used in the article. Please address the following questions:

- What real-life behavior are the authors trying to study? Why is it important? (Please remember that I am not an expert in your field. You don't have to write a survey article for me, but try and give some idea of what is going on.)
- Describe the mathematical model that the authors propose, in terms that a classmate could understand. This may require further research on your part.
- If the model is similar to something we have studied in class, discuss how some of the things we know about it might be relevant. (For instance, if the article is using a Markov chain to model wombat population, perhaps the recurrence of the chain predicts mass wombat extinction.)
- What are some aspects of the real-life behavior that the model does a *good* job of describing?
- What are some aspects that the model doesn't describe well? In what ways is the model unrealistic? How could the model be improved to remedy this?
- Are there other models commonly used to describe this behavior? (The article may give useful references.) Why have the authors chosen this one instead?
- Do the authors compare the predictions of their model (from theory or from simulations) with data from real-life observations or experiments? If so, what did they find?

Here are some guidelines on writing and submitting your review:

- Please type it. LaTeX or LyX is highly encouraged (and also an essential skill for any professional mathematician, so why not learn now?). Microsoft Word is discouraged, because it tends to produce crappily formatted math that is hard for me to read, but I will suffer through it if you insist.
- This is an individual project. You are welcome to discuss the project with classmates, friends, professors, or others, but the work you submit must be your own. If someone provides useful comments, it would be courteous to thank them in the paper.
- Your writing must be clear, correct, and well-organized. Write as if your work were going to be published in a professional journal. Be sure to reread and revise as needed.
- When you include equations or math symbols, please do your best to ensure that they are well-formatted and legible. Variables should be in italics. If you use LaTeX or LyX, math mode will take care of all this quite nicely.
- There is no particular upper or lower bound on the length of your review. Use whatever amount of space you need to address the points you want to make. There is no need to play games with margins or font sizes to inflate/deflate your page count; just format it legibly.
- Give full citations of all sources, including the article you are reviewing. (This means at least: article title, authors' names, journal title, volume and page number, date.) Direct quotes must be indicated as such, and the source named specifically. You may use any citation style common in your field.
- If the article you are reviewing is available online (and Cornell has access), include a URL. If it is not, please attach a scan or photocopy to your review.
- Due date: A draft is due by class time on **Monday, April 23**. The draft should be substantially complete and contain all the required elements. I will return it with

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comments within one week. The final version is due by **4:00 PM, Friday, May 11**.

- Email submissions are encouraged. Please use PDF format only and send to neldredge@math.cornell.edu.
- The project is worth 7% of your final grade, broken down as follows:
  - 20%: Submission of a substantially complete first draft.
  - 25%: Showing a reasonable understanding of the article.
  - 25%: Addressing the questions listed above.
  - 30%: Clear, well-organized, professional, and mechanically correct writing.
- Late submissions (of either draft) will lose value exponentially at a rate of 1% per hour. (Exercise: Compute the half-life.)
- If you have a great idea for something to look at which doesn't quite fit the guidelines of this project, that's fantastic! Let me know and we can discuss it.

Feel free to come see me with any questions that may arise at any stage of this project!

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You are logged in as Nate Eldredge (Logout)

Math 4740