

## Final Honour School of Mathematics Part C

### C5.4 Networks

Non-backtracking random walks have, in recent years, attracted much attention in different aspects of network science, from community detection to the design of centrality measures and the study of epidemic processes.

Write a report on a specific subtopic within the general heading of non-backtracking random walks on networks. Your report must include some numerical simulations (which you produce) and must include a discussion of modelling issues, random-graph ensembles, and empirical data.

Your report should be in the format and style of an article for the journal Proceedings of the National Academy of Sciences, and the main text must be no more than 6 typeset pages and must use their LaTeX style files (a template and style files will be provided). The report must include all sections (abstract, significance, statement, etc.) in papers published in that journal (2017 format of papers). It is permissible to include a section of Supplemental Information that shows additional figures and calculations. In your report, indicate explicitly which ideas are new and which come from existing sources, and use appropriate and explicit attributions for all references (which must include papers reporting original research) or anything else (e.g., including code and figures) from other sources.

[You are expected to submit scripts for any code you produce, as part of Supplemental Information.]

[Your report need not contain original research results, though you must use some original research papers (not just review articles or books) as resources.]