Combinatorial methods in group theory and group-theoretic methods in combinatorics

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Abstract

This mini-course will describe a number of helpful methods from combinatorics and group theory that can be applied in those areas, and more especially to the study of discrete objects such as graphs and maps and polytopes with a large degree of symmetry.

Topics will include the following:

1. Basic applications of counting
2. Methods for generating random elements of a group
3. Cayley graphs
4. Schreier coset graphs and their applications
5. Backtrack search to find subgroups of small index
6. Double-coset graphs and some applications
7. Möbius inversion on lattices and applications.