Combinatorial Enumeration

Winter 2022, MATH 5819W
School of Mathematics and Statistics, Carleton University

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Lectures (online) : Tuesday and Thursday 1:05 - 2:25pm.
Office hours: Tuesday and Thursday 10:30-11:30am, or by appointment.

General Information

- **Textbook:** "Analytic Combinatorics", by P. Flajolet and R. Sedgewick, Cambridge University Press 2009.
- **Reference:** Generatingfunctionology, Herb Wilf

This course will be delivered online using ZOOM in Brightspace. To access your courses in Brightspace go to

https://brightspace.carleton.ca Please use the *help link* there if you need further assistance.

This class or portions of this class will be recorded by the instructor for educational purposes. These recordings will be shared only with students enrolled in the course. Your instructor will communicate how you can access the recordings.

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A tentative schedule

Topics	Book chapter	approx. # of weeks
Enumeration examples, exact formulas, asymptotic formulas, recursions, ordinary and exponential generating functions, formal power series, the multi-section formula, Dirichlet generating functions, Möbius inversion formula.	Invitation, A1,A5.	1.5
Symbolic enumeration methods for unlabelled structures, ordinary generating functions, words, trees, integer compositions and partitions.	I	2
Symbolic enumeration methods for labelled structures, exponential generating functions, permutations, set partitions, labelled trees, some special constructions.	II	2.5
Test, during Tuesday's lecture		**Mar 01**
Combinatorial parameters and multivariate generating functions, use bivariate generating functions to compute average and variance.	III	2
Power series and singularities, Darboux's theorem, singularity analysis and transfer theorems, saddle point method and Hayman's theorem, Lagrange inversion formula.	VI.1-6, VII. 1-5 VIII. 1-5	2.5
Transfer matrix models, distributions of parameters of random structures.	V.6, IX.1-5	1.5
Total		12.5

Evaluation

- Final Exam 60% (a 3-hour closed book examination).
- Assignments (2) 20%.
- Midterm test 20%. To be held on **Mar 03 (Tuesday).**

Assignments will be posted on brightspace; in due time solutions will also be posted. Late assignments will not be accepted. In order to pass the comprehensive a final exam mark of 70% is required; see the graduate calendar for details.

Plagiarism is a serious academic offence and may lead to a failure grade.

Retain your marked assignments and test until the final examination. You can check your term marks on brightspace, any error in your recorded mark should be called to my attention before the final examination.

Academic accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:
Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://www2.carleton.ca/equity/
Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://www2.carleton.ca/equity/
Academic Accommodations for Students with Disabilities: The **Paul Menton Centre** for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your ***Letter of Accommodation*** at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (*if applicable*) at http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines/
You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at http://www2.carleton.ca/eq