MAS480A, 2019 Fall, KAIST

Topics in Mathematics: Matroid Theory

수학특강 : 매트로이드 이론

Please see the following document for a quick introduction to matroids:
J. Oxley, ***What is a matroid?****,* `https://www.math.lsu.edu/~oxley/survey4.pdf`

This course will introduce the notion of matroids, a common generalization of vector spaces and graphs. We will start with learning several equivalent definitions of matroids and then study various aspects of matroids, including duality and minors, matroid intersection and union theorems, representable matroids and graphic matroids.

It is recommended to have some prior knowledge on elementary linear algebra as well as graph theory.

Lecture	MW 9:00AM-10:15AM	Classroom: E6-1 (자연과학동), Room 3434
Instructor	Sang-il Oum (엄상일)	`https://dimag.ibs.re.kr/home/sangil/`
	Email: sangil@kaist.edu	
	Office: E6-1 Room 3403 at KAIST and B221 at the Institute for Basic Science.	
Office Hours	T.B.A.	
Course website	`https://klms.kaist.ac.kr/`.	
Textbook	There is no main textbook.	
	For references, please see the following:	
	G. Gordon, J. McNulty, *Matroids: A Geometric Introduction*. Cambridge.	
	J. Oxley, *Matroid Theory*, Oxford University Press.	
Grading	40% Homework, 30% Midterm, 30% Final.	
	The lowest score and the second lowest score from assignments will be dropped. You will earn A if (but not only if) your score is at least 90, B if your score is at least 80, C if your score is at least 70.	
Exams	Midterm and final exams will be take-home exams. 12 hours will be given and students will need to type their solution into a PDF file (LaTeX preferred) and upload it to a website that will be announced.	
	You must not collaborate with other students on exams.	
Homework	Homework will be given biweekly online on Wednesday. The due is Monday 11:30pm. Students will need to type their solution into a PDF file (LaTeX preferred) and upload it to a website that will be announced.	
	You may collaborate with other students. But **homework should be written by yourself independently and you must understand your solution.**	
Plan	**Week 1-2** A tour of matroids.	
	Week 3-4 Cryptomorphisms.	
	Week 5-6 New matroids from old (Deletion and Contraction, Duality, Connectivity)	
	Week 7 Matroid Intersection and Unions.	
	Week 8 Midterm Exam	
	Week 9 Graphic Matroids.	
	Week 10 Finite Geometry.	
	Week 11 Representable Matroids.	
	Week 12 Other Matroids.	
	Week 13-14 Matroid Minors. The Splitter Theorem.	

Week 15 Tutte Polynomial

Week 16 Final Exam

This plan is subject to change.

- Hint for the course: Attend the class, Understand notions through examples, Ask questions, Do the homework.