Math 235b - Reflection Groups
Spring 2014

Instructor: Anna Lachowska, 404 DL. Office hours: Mon Tue 4:30-6pm.

1. Brief Description

A link between linear algebra and abstract algebra, in particular group theory, Lie algebras and representation theory. Topics include: Orthogonal transformations and reflections in a real Euclidean space, groups generated by reflections, Coxeter groups, crystallographic groups, classification of finite Coxeter groups.

2. Text

C.T.Benson, L.C.Grove, *Finite Reflection Groups*, Second Edition, Springer, 2010.

3. Syllabus

week	reading	topic
Jan 13-17	2.1- 2.2	Orthogonal transformations in 2 dimensions
Jan 20-24	1.1 - 1.2	Basics of group theory
Jan 27 - Jan 31	2.3 - 2.4	Orthogonal transformations in 3 dimensions
Feb 3 - 7	2.5 - 2.6	Finite groups in 3 dimensions
Feb 10 - 14	3.1	Fundamental regions
Feb 17 - 21	4.1	Coxeter groups, root systems
Feb 24 - Feb 28	4.2	Fundamental regions for Coxeter groups
Mar 3 - 7	5.1	Coxeter graphs
Mar 24 - 28	5.2	Classification of the finite root systems
Mar 31 - Apr 4	5.3	Construction of Coxeter groups
Apr 7 -11	5.4	Order of irreducible Coxeter groups
Apr 14 - 18	6.1	Generators and relations for Coxeter groups
Apr 21 - 25		Applications and review

4. Evaluation

Homework - 20%, Midterm - 30%, Final - 50%.

5. Midterm

Tuesday, March 27 in class.