Real Algebraic Geometry and Convex Optimization
Math 591-003, Spring 2019

T, Th 3:00 - 4:15pm, 1218 SAS Hall
(Tentative) Office Hours:
T, W 11am-12pm, or by appointment

Instructor: Cynthia Vinzant
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Course website: https://clvinzan.math.ncsu.edu/teaching/591

Prerequisites: Math 520 or Math 523 or instructor consent

Textbook: There is no official textbook for the course. Some readings and other resources will be posted on the course website.

Course Description: Real algebraic geometry is the study of solutions to polynomial equalities and inequalities over the real numbers. It provides powerful tools to understand the geometry behind many problems in optimization and develop new methods for solving them. This class will introduce basic notions and techniques in real algebraic geometry, convexity, and conic optimization. Further topics include semidefinite programming, sums of squares, moment problems, hyperbolic and stable polynomials, and several applications in polynomial and combinatorial optimization.

Homework: Homework will be assigned every one to two weeks and collected in class.

Final Project: Students will write a final paper (due Tuesday, May 7) on a topic related to real algebraic geometry and convex optimization and give a presentation in class at the end of the semester. Further details and suggested topics will be posted on the course website and discussed in class.

Grades: Grades will be assigned based on homework (70%), oral presentation of the final project (10%), and written final project (20%).

Academic Integrity: Students are expected to follow the NC State code of student conduct, available at http://policies.ncsu.edu/policy/pol-11-35-01.

Students with disabilities: Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. More information on NC State's policy on working with students with disabilities is available at http://policies.ncsu.edu/regulation/reg-02-20-01.

Class Evaluations: Online class evaluations will be available for students to complete during the last two weeks of class. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will never know how any one student responded to any question, and students will never know the ratings for any particular instructors.