Math 290: Birational Geometry of Algebraic Varieties

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Office Hours: TBA (or by appointment)
Office: Science Center 525

Class Hours: MW 12-1:15 EST
Location: Zoom

Course Description

The classification of algebraic varieties up to birational equivalence is one of the major questions of higher dimensional algebraic geometry. This course will serve as an introduction to the subject, focusing on the minimal model program (MMP). The MMP is the part of the classification program which attempts to describe the "simplest" representatives within a given birational equivalence class. If time permits, we will discuss applications of the MMP to moduli of higher dimensional varieties.

Course Website

http://people.math.harvard.edu/~bejleri/teaching/math290fa20/

Text

The first part of the course will follow

- Kollár and Mori, *Birational Geometry of Algebraic Varieties*. Cambridge University Press, 1998.

The following texts, among others, may also be of interest.

- Kollár, *Singularities of the Minimal Model Program*. Camrbidge University Press, 2013.
- Kollár, *Families of Varieties of General Type*. Manuscript available on authors website.

Prerequisites

Algebraic geometry at the level of a first year graduate course (e.g. chapters 2 and 3 of Hartshorne's *Algebraic Geometry*). Some algebraic topology and commutative algebra may also be useful. Please see me if you are not sure you have the needed background.

Homework and Grades

Undergraduate students and graduate students who have not passed their Quals require a grade. The grade will be based off of homework as well as a final expository paper *or* presentation.

Homework will be assigned periodically during lectures and posted on the course website. It will be due two weeks after being posted. Students are encouraged to work together.

Hardware

Students will be need to have a tablet and stylus to facilitate online collaboration. To borrow an iPad from Harvard, send an email to `ipadrequest@fas.harvard.edu`.