

Michigan Math Club



Thursday at 4pm in EH1360
Pizza and pop outside afterwards!

Directed Reading Program Presentations

09 December 2021

Proofs of the Isoperimetric Inequality Ashvin Pai

Intuitively, we can say that given some perimeter, L , a circle with circumference L is the figure that bounds the greatest area. However, as it turns out, it is difficult to provide a rigorous proof of this statement, known as the isoperimetric inequality. In this talk, we go through Steiner's attempt at an intuitive geometric proof of the isoperimetric inequality, outlining several pitfalls in his method before concluding with a modern, rigorous (but not as intuitive) proof of the inequality using differential geometry.

Projective Plane and Bézout's Theorem Yanjun Chen

Many years ago, to create better arts, artists opened a new geometry area called projective geometry. It turns out that this framework of geometry is powerful and has many great properties. In this presentation, we will introduce the basic idea of the projective plane and the proof of the easy case of Bézout's theorem. We will mainly focus on lines and conics but also have a taste of a cubic surface.

Applying Black-Scholes to the Real World Vishal Nayak

Over the past few decades, there has been a massive increase in options trading. One of the major developments in this field that accompanied this boom is the advent of the Black-Scholes formula for pricing options. The Black-Scholes formula is a partial differential equation that relates the partial derivatives of an option's price with respect to time and the underlying stock price. It has strong theoretical support, but can it be used to trade options in the real world? In this talk, we examine some of the theoretical underpinnings of the Black-Scholes formula. We also compare the predictions of the formula to real-world options prices using various implied volatility estimates. In doing so, we try to determine which assets, strike prices, and expiration terms does the Black-Scholes model best predict options prices.

