

**Undergraduate Math Club  
Fall 2007  
2<sup>nd</sup> floor Nesbitt Common Room  
December 6, 4:10-5:00pm  
(free pizza and pop, as always)**

# **Surreal numbers and games**

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## **Abstract**

In this talk we will consider strategies for two-player games where the goal is to make the last move, leaving the opponent with no moves. We will intuitively discuss the notion of the value of a game, a measure of a player's amount of advantage or disadvantage.

We will focus on games whose positions can be assigned ``numerical'' values, including integers, fractions, real numbers, and surreal numbers. Surreal numbers include different kinds of infinity, such as  $\infty/2$  and  $\infty - 1$ , and also positive ``numbers'' smaller than any positive real number. The surreal numbers are a much larger field containing the real numbers. Like the real numbers, surreal numbers can be ordered and enjoy most of the properties of the real numbers.

If there is time left, we will discuss games whose positions can be assigned ``positive'' values even smaller than any positive surreal number. The universe of small games is quite vast. This talk is the beginning of a fascinating branch of mathematics called combinatorial game theory.