

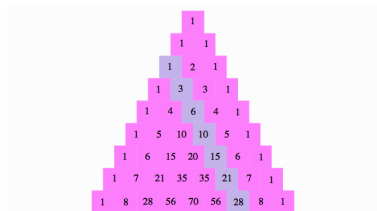
STudent ResEArch TalkS (StReaTs)

Mason Experimental Geometry Lab (MEGL)

Sums of Discrete Functions

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Abstract

We know how to compute integrals of polynomial functions. For example we know that $\int x^2 dx = \frac{x^3}{3}$. We provide a method for computing similar discrete identities for sums of the form

$$\sum n^2, \sum n^3, \text{etc..}$$

The goal of this talk is to point out that methods exist for finding such sums. The majority of the material for this talk comes from Jeffrey Stopple's *A Primer of Analytic Number Theory*.

We will begin by answering the question posed above, and give a general method. We will then explore other sums and patterns to develop intuition on the subject. We will discuss as many of the following topics as time allows: triangular numbers, tetrahedral numbers, pentagonal numbers, hexagonal numbers, the Stirling numbers. It will help to be familiar with the *factorial powers* often defined as

$$n^{\underline{m}} = n(n-1)(n-2)\dots(n-(m-1)).$$

Date: Friday, October 16, 2015

Time: 2:30pm–3:30pm

Place: Exploratory Hall 4106

Pizza and soda will be served at the presentation.

For further information or for special accommodations, please contact Sean Lawton via email at seanlawton@gmail.com or drop by the MEGL.