Radical Pi presents:

Creating More Convergent Series

by Professor Jeffery McNeal

Given an infinite sequence of real numbers $a_1, a_2, \ldots$, when does their sum $\sum_{k=1}^{\infty} a_k$ make sense, i.e., when is $\sum_{k=1}^{\infty} a_k$ convergent? Many tests for convergence are studied in beginning analysis courses, as well as some structure theorems about infinite series. For instance, a theorem of Weierstrass–*absolutely* convergent series sum to the same number regardless of the order that the terms $a_1, a_2, \ldots$ are added–is part of our standard curriculum.

However the following question is usually not asked: is there a once-and-for-all rearrangement of the positive integers so that adding sequences according to that ordering causes **more** series to converge? The somewhat surprising–but completely elementary–answer is “Yes”! We’ll discuss this fact, after reviewing more standard convergence results, in this talk.

Wednesday, November 19, 5 PM

Undergraduate Math Study Space (MA 052)

Free pizza!

Background image

The sum of $x^k/(1 + y^k)$ from $k = 1$ to 100, colored by the following scheme:

Red (≤ -32) – White (0) – Blue (≥ 1024)