TEMPLE
MATH CLUB

Series Expansions from Orthogonal Functions –
Katharine Ott

WHEN
March 28, 2024
5-6 PM

WHERE
Wachman Hall 617

A series expansion expresses a given function as an infinite sum of simpler functions. Given an orthogonal basis of functions, one can compute a series expansion with a tool from linear algebra: orthogonal projections. Fourier series are a well-known example of this procedure, where the orthogonal basis of functions is the set {1, sin (x), cos(x), sin (2x), cos(2x) , … }. Taylor series, introduced in Calculus II, are a seemingly different kind of series expansion. Taylor series are assembled using the simple functions {1, x , x^2, … } but this set is not orthogonal. Is there any relationship between orthogonal series expansions and Taylor series? This talk will explore this question using ideas from calculus and linear algebra.

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