ANALYSIS SEMINAR

CONFORMAL MAPS AND ORTHOGONAL POLYNOMIALS FOR PLANAR REGIONS WITH ANALYTIC BOUNDARIES, PART II

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Wednesday, September 24 at 2:00 pm in Hume 331

Abstract : *For an arbitrary analytic Jordan curve L in the complex plane whose interior domain is denoted by G, we shall look at the sequence of polynomials $p_n(z)$, $n = 0, 1, 2, \ldots$ (p_n of exact degree n) that are orthonormal over G with respect to area measure, that is,*

$$\int_G p_n(z)\overline{p_m(z)}dA(z) = \begin{cases} 0, & m \neq n, \\ 1, & m = n, \end{cases}$$

where dA is the two-dimensional Lebesgue (area) measure.

Specifically, we want to understand how these polynomials and their zeros behave as the degree $n \to \infty$. We shall give a quite complete and satisfactory answer to the question, which required us to gain a good understanding of the meromorphic continuation properties of the interior and exterior canonical conformal maps associated with the analytic curve L. The results will be illustrated with some concrete (far from trivial) examples and numerical computations. Results have been obtained in collaboration with Dr. P. Dragnev of Indiana-Purdue University Fort Wayne.