Analysis Seminar

SHIFT OPERATORS ON HARMONIC HILBERT FUNCTION SPACES AND VON NEUMANN INEQUALITY

By

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Abstract: The classical von Neumann inequality from 1951 puts an upper bound on the norm of the holomorphic polynomial of a Hilbert space operator that is a contraction. Drury in 1978 and Arveson in 1998 generalized this to a tuple of commuting operators that is a row contraction. The upper bound is modified to the norm of the holomorphic polynomial of a tuple of shift operators acting on a specific holomorphic function space now called the Drury-Arveson space. We extend this to a new setting by allowing a harmonic polynomial and a harmonic function space. We define shift operators on harmonic function spaces from scratch, we identify the reproducing kernel Hilbert spaces that is the counterpart of the Drury-Arveson space, and prove a von Neumann inequality for row contractions that are of harmonic type. A byproduct of our work with shift operators is a new identity for zonal harmonics and hence for Gegenbauer polynomials in terms of the Kelvin transform and derivatives of the fundamental solutions of the Laplacian.
This is joint work with Daniel Alpay of Chapman University, Orange, CA.

Date: 24 February, 2021
Time: 13:30-14:30, GMT+3.
Place: ZOOM

To request the event link, please send a message to goncha@fen.bilkent.edu.tr