

GRADUATE SEMINAR

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QUANTUM MEASURE AND INTEGRATION

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3:45 pm

University of Regina
Mathematics & Statistics Lounge
College West 307.20

Abstract:

A quantum measure ν is a function on a σ -algebra of subsets of a (locally compact and Hausdorff) sample space that satisfies the formal requirements for a measure, yet where the values of ν are positive operators acting on a complex d -dimensional Hilbert space. In 2011, D. Farenick, S. Plosker, and J. Smith introduced a new kind of quantum integration which involved an operator-valued Radon-Nikodým derivative. Building on this work, Farenick and M. Kozdron studied quantum analogues of conditional expectation and Bayes' rule. The new tools needed were theorems for a change of quantum measurement and a change of quantum variables. Kozdron and his former student K. Johnson in 2022 extended those results further by proving a quantum martingale convergence theorem. The key fact that was used in all of this work was the finite-dimensionality of the Hilbert space. The goal in this talk is to review all of these basic tools to set the stage for my future research, namely developing Bayes' rule and a martingale convergence theorem when the Hilbert space is infinite dimensional.