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Spectral theory and descriptive combinatorics for Borel pmp graphs

In classical spectral graph theory, one associates to finite graphs Hermitian matrices, such as the adjacency matrix, that encode graphical information. The spectral properties of these matrices are then leveraged to analyze the combinatorial features, including vertex coloring, edge coloring, and matching, of the corresponding graphs. Analogously, one can associate bounded, self-adjoint operators, such as the adjacency operator, to Borel pmp graphs of bounded degree. In this talk, we present new descriptive combinatorics results for pmp graphs that involve the application of spectral theory to their associated operators. This is joint work with Pieter Spaas, Alexander Tenenbaum, and Sofia Torelli.