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Nobuaki Obata*, Aoba-ku, Sendai, Miyagi 9808579, Japan. *Asymptotic Spectral Distributions for Growing Distance-Regular Graphs.*

We report some new achievements concerning quantum probability approach to spectral analysis of growing graphs. For growing distance-regular graphs with classical parameters the explicit forms of scaled limit distributions are derived. Our result covers Grassmann graphs, Ustimenko graphs, dual polar graphs and their variants, and so forth, and their limit distributions are described in terms of hypergeometric functions. Next we discuss an attempt of bivariate generalization by means of the Cartesian powers of a strongly regular graph and its complement, G^n and \bar{G}^n . We obtain the joint spectral distribution of the pair of adjacency matrices (A_n, \bar{A}_n) and show that the limit distribution is described in terms of Gaussian and Poisson distributions. The corresponding orthogonal polynomials are the limit of bivariate Krawtchouk polynomials, a particular class of Aomoto–Gelfand hypergeometric functions. The first part is mostly based on the recent joint work with M. Koohestani and H. Tanaka [SIGMA 17 (2021), 104, 22 pages] and the second on the one with J. V. S. Morales and H. Tanaka [Colloq. Math. 162 (2020), 1–22]. (Received January 12, 2022)