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Spectra of Adjacency Matrices in Networks of Extreme Introverts and Extroverts¹ KEVIN E. BASSLER, MOHAMMADMEHDI EZ-ZATABADIPOUR, Department of Physics, University of Houston, R.K.P. ZIA, Department of Physics and Astronomy, Iowa State University, Ames and Center for Soft Matter and Biological Physics, Physics Department, Virginia Tech — Many interesting properties were discovered in recent studies of preferred degree networks, suitable for describing social behavior of individuals who tend to prefer a certain number of contacts. In an extreme version (coined the XIE model), introverts always cut links while extroverts always add them. While the intra-group links are static, the cross-links are dynamic and lead to an ensemble of bipartite graphs, with extraordinary correlations between elements of the incidence matrix: n_{ij} . In the steady state, this system can be regarded as one in thermal equilibrium with long-ranged “interactions between the n_{ij} s, and displays an extreme Thouless effect [details in JSTAT P07013, 2015]. Here, we report simulation studies of a different perspective of networks, namely, the spectra associated with this ensemble of adjacency matrices $\{a_{ij}\}$. As a baseline, we first consider the spectra associated with a simple random (Erdős-Rényi) ensemble of bipartite graphs, where simulation results can be understood analytically.

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