Mean-field solution of equilibrium ensembles of undirected networks with 3-edge interactions[1] PETER FLECK, Center for Complex Systems Research, Department of Physics, University of Illinois at Urbana-Champaign, NOSHIR CONTRACTOR, Science of Networks in Communities (SONIC) Group, National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign — We study the equilibrium statistical mechanics of ensembles of undirected networks with triangle- and 3-star-type interaction among bi-valued edges. We present analytical expressions for the statistics' averages in mean-field approximation. We find this model's phase diagram to be identical after parameter substitution to that of a reduced model with triangle interactions only. For sufficiently large networks, both triangle- and 3-star-type interactions affect the network's topology very similarly. We find the mean-field solution to agree excellently with Markov Chain Monte Carlo simulations in an important part of parameter space. Implications for the analysis of network topologies are being discussed.

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