[P3] Properties and a model of bipartite ecological networks

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We studied on the bipartite networks consisting of plants and pollinators. We investigated the structural properties of the networks such as the distribution functions of degree and strength, disparity, and the correlations for degrees and strengths. The degree and strength distributions took different functional forms for plants and pollinators. We observed stretched exponential distributions for plants, but power law distributions for pollinators. Link weights distributed unevenly, as measured by disparity. We also observed the disassortativity of the degrees of connected nodes. However, we could not observe any significant relationship for the strengths of connected nodes. We introduced a simple random network model to understand the emergence of different degree distributions in bipartite networks. Setting the connecting probability differently for plants and pollinators, we derive the degree distributions from a simple rate equation, and study their dependence on the connecting probabilities.