Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Distribution of Node Characteristics in Complex Networks[1] JUYONG PARK, A.-L. BARABASI, Northeastern University — Our enhanced ability to map the structure of various complex networks is accompanied by the capability to independently identify the functional characteristics of each node, leading to the observation that nodes with similar characteristics show tendencies to link to each other. Examples can be easily found in biological, technological, and social networks. Here we propose a tool to quantify the interplay between node properties and the structure of the underlying network. We show that when nodes in a network belong to two distinct classes, two independent parameters are needed. We find that the network structure limits the values of these parameters, requiring a phase diagram to uniquely characterize the configurations available to the system. The phase diagram shows independence from the network size, a finding that allows us to estimate its shape for large networks from their samples. We study biological and socioeconomic systems, finding that the proposed parameters have a strong discriminating power. [2]

[1]supported by the James McDonnell Foundation, NSF, NIH, and NORT
[2]J. Park and A.-L. Barabási, *Proc. Nat. Acad. Sci.* **104**, pp. 17916–17920 (2007)

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Date submitted: 26 Nov 2007 Electronic form version 1.4