real networks *models*

introduction to *network analysis* (*ina*)

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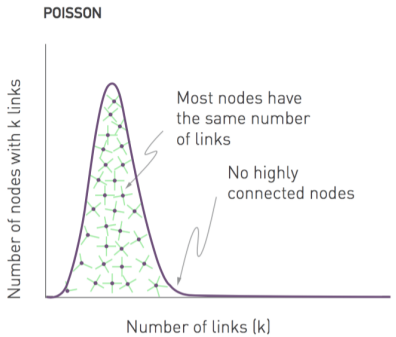
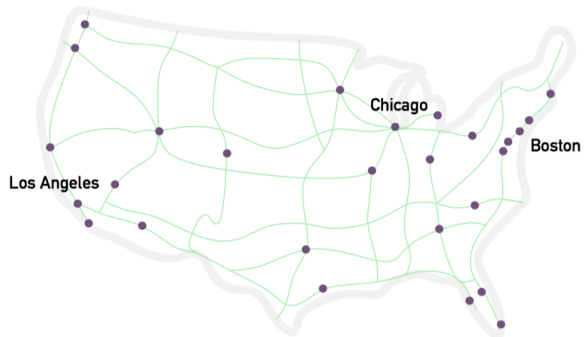
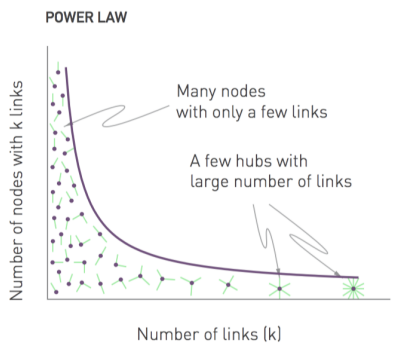
networks *scale-free*

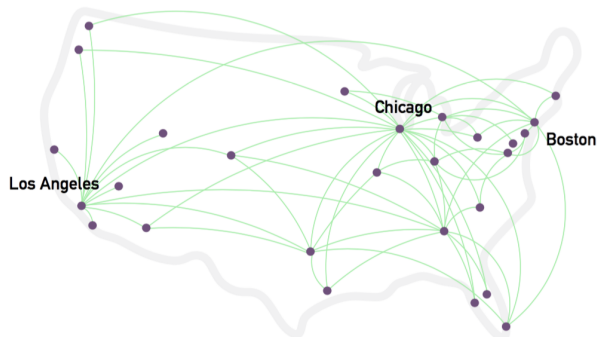
— *power-law* degree distribution $p_k \sim k^{-\gamma}$ [Pri65]

— *preferential attachment scale-free* model [BA99]





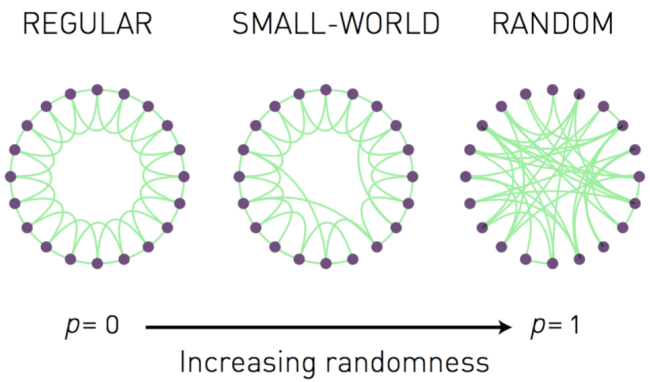


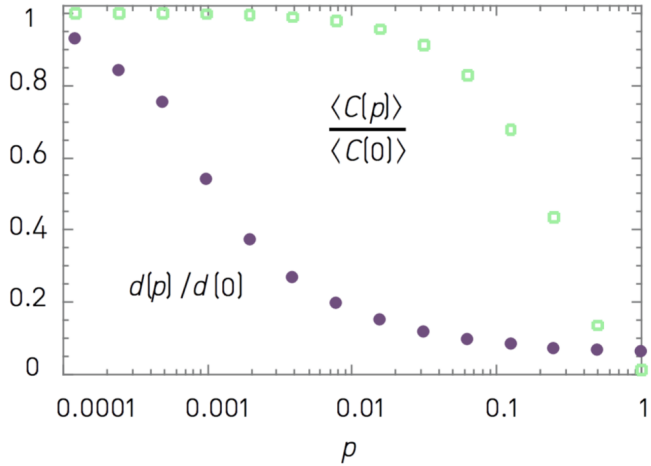


networks *small-world*

— *coexistence* of $\langle C \rangle \gg 0$ and $\langle d \rangle \simeq \frac{\ln n}{\ln \langle k \rangle}$

— *link rewiring small-world* model [WS98]





networks *references*

A.-L. Barabási and R. Albert.

Emergence of scaling in random networks.
Science, 286(5439):509–512, 1999.

A.-L. Barabási.

Network Science.
Cambridge University Press, Cambridge, 2016.

Wouter de Nooy, Andrej Mrvar, and Vladimir Batagelj.

Exploratory Social Network Analysis with Pajek: Expanded and Revised Second Edition.
Cambridge University Press, Cambridge, 2011.

David Easley and Jon Kleinberg.

Networks, Crowds, and Markets: Reasoning About a Highly Connected World.
Cambridge University Press, Cambridge, 2010.

Ernesto Estrada and Philip A. Knight.

A First Course in Network Theory.
Oxford University Press, 2015.

Mark E. J. Newman.

Networks.
Oxford University Press, Oxford, 2nd edition edition, 2018.

D. J. de Solla Price.

Networks of scientific papers.
Science, 149:510–515, 1965.

D. J. Watts and S. H. Strogatz.

Collective dynamics of 'small-world' networks.
Nature, 393(6684):440–442, 1998.