

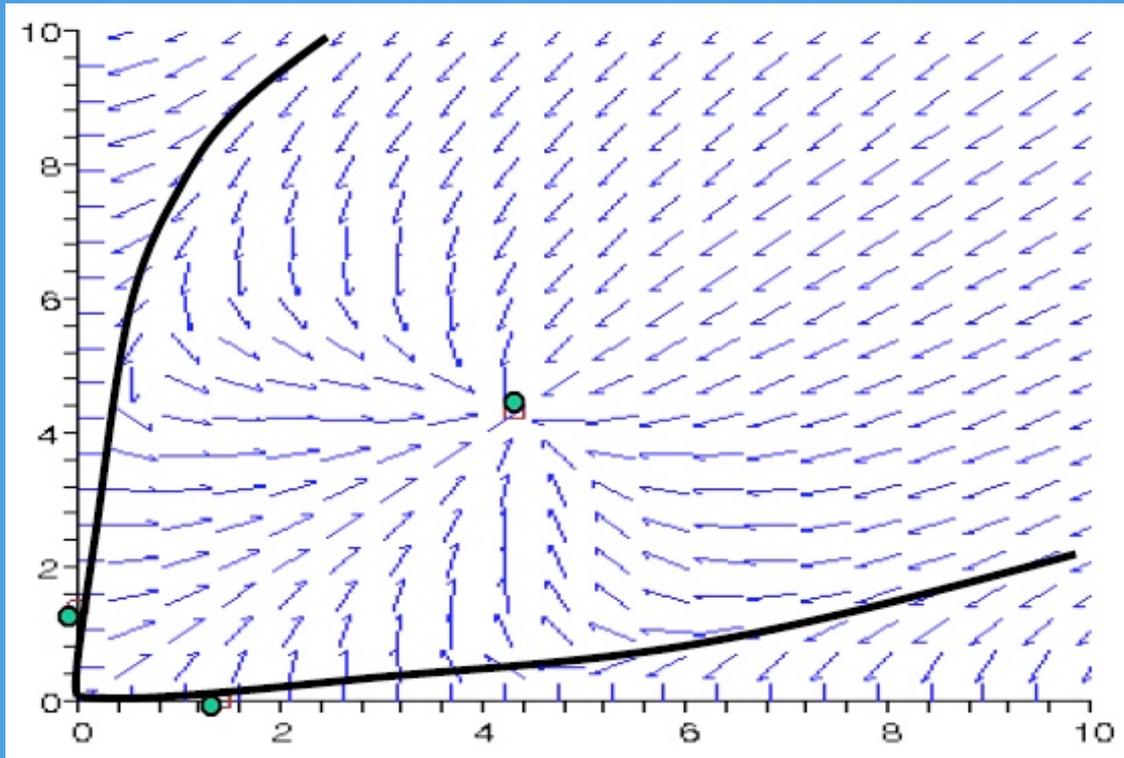
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# complex systems

# September

IMAGE OF  
THE MONTH

*From Network Microeconomics to  
Network Infrastructure Emergence*



Capacity adjustments by two competing providers. Three equilibria are possible: one equilibrium with both providers supplying bandwidth (center green dot) and two equilibria with only one provider supplying bandwidth and another provider driven out of business.

More information available at: <http://www.itl.nist.gov/ITLPrograms/ComplexSystems/>

Evolutionary models of network infrastructure in a market economy can be derived from the underlying selfish behavior of users and providers of network services in the same way as non-equilibrium thermodynamics is

derived from the underlying statistical physics of interacting particles.

This approach may be useful for overcoming restrictions of existing models failing to account for the effect of

the details of user/provider selfish behavior on the natural evolution of the infrastructure.



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The Complex Systems Program is part of the National Institute of Standards and Technology's Information Technology Laboratory. Complex Systems are composed of large interrelated, interacting entities which taken together, exhibit macroscopic behavior which is not predictable by examination of the individual entities. The Complex Systems program seeks to understand the fundamental science of these systems and develop rigorous descriptions (analytic, statistical, or semantic) that enable prediction and control of their behavior.

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