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complex systems

November

A Structural Approach to the Temporal Modeling of Networks

	Node Degree	Number Nodes
1	55	1
2	20	1
3	17	1
4	15	1
5	14	1
6	13	1
7	11	2
8	10	1
9	9	3
10	8	5
11	7	4
12	6	9
13	5	19
14	4	24
15	3	61
16	2	169
17	1	209
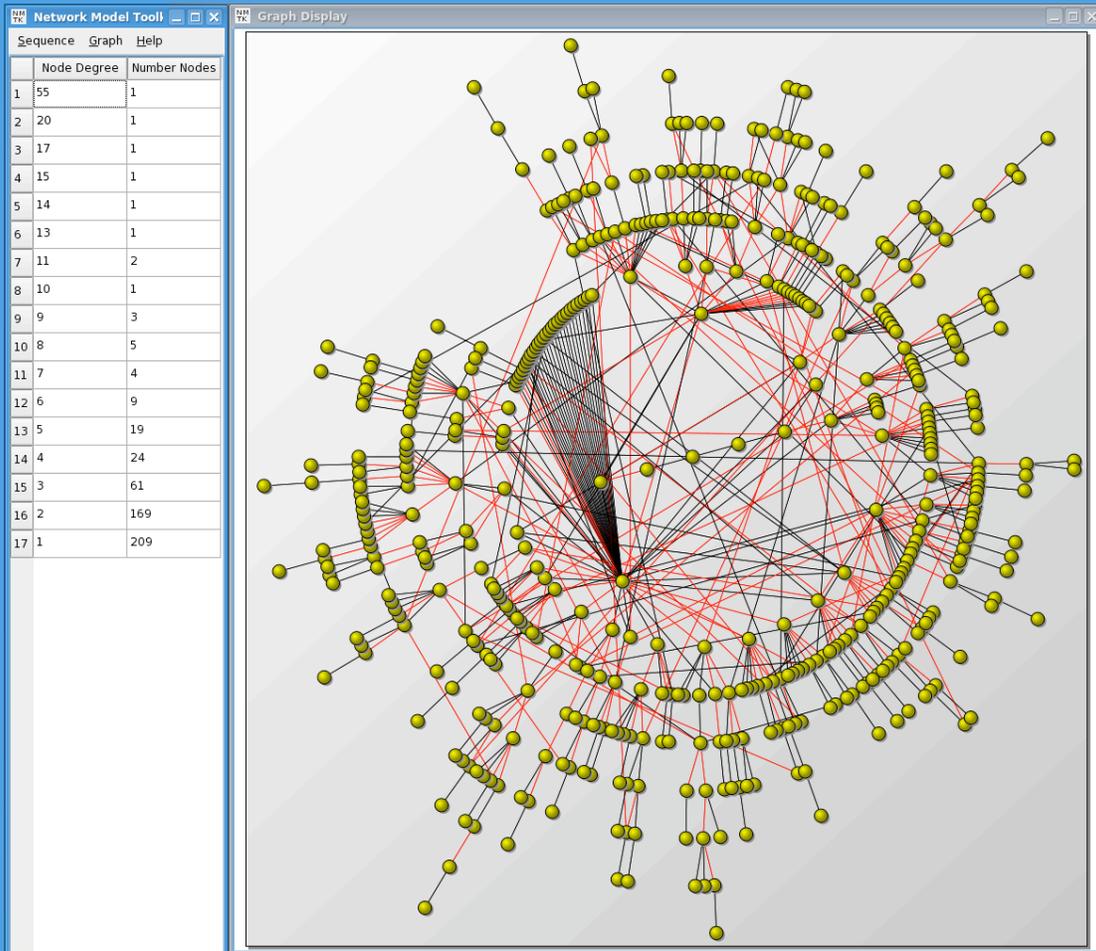
This figure shows a temporal model of a subset of the autonomous system (AS) topology of the Internet. The red edges denote the original "core" graph from a November 2007 instance of the AS topology. The black edges are the additional connections added to the network model to represent a future time period.

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

Simulation of many real world systems such as the Internet and social networks requires developing dynamic models for the underlying networks in these systems. Currently, there is a large body of work devoted towards determining the underlying mechanisms that create these networks, but the resulting models have not realistically captured many of the important structural characteristics when compared with real world examples. Towards creating more realistic dynamic models, we propose a method of structurally constructing models of an evolving network.

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