

STANFORD UNIVERSITY  
DEPARTMENT OF STATISTICS  
DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, December 3, 2002  
Sequoia Hall Room 200  
(Cookies at 3:45 in 1st Floor Lounge)

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**Markov equivalence and essential graphs for graphical Markov models**

Graphical Markov models (GMM) use graphs, either undirected, directed, or mixed, to represent global dependences among statistical variables by means of local specifications, thereby achieving substantial computation efficiencies. Examples of GMMs include (finite) Markov random fields, Bayesian networks, and influence diagrams. We shall review the basic Markov properties of GMMs determined by undirected graphs, acyclic directed graphs, and acyclic graphs = "chain graphs", which allow both undirected and directed edges with no partially directed cycles, and briefly discuss their statistical analysis. Three topics of current interest will be noted: characterizing Markov-equivalent graphs, unique representation of a Markov equivalence class by means of its "essential graph", and the existence of competing Markov interpretations of the same chain graph.