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Nikhyl Bryon Aragam* (bryon@stat.ucla.edu), **Arash Amini** and **Qing Zhou**. *Concave penalized estimation of sparse Gaussian Bayesian networks: Algorithms and theory*.

Research into graphical models is a rapidly developing enterprise, garnering significant interest from both the statistics and machine learning communities. A parallel thread in both communities has been the study of low-dimensional structures in high-dimensional models with $p \gg n$. Recently, there has been a surge of interest in connecting these threads in order to understand the behaviour of graphical models in high-dimensions. We propose a framework for estimating Gaussian Bayesian networks which is motivated by problems from the regression literature. We show how to adapt recent work in sparse learning and nonconvex optimization to the structure learning problem for Bayesian networks in order to estimate DAGs with several thousand nodes. This framework applies to a general class of regularizers, including the MCP, SCAD, ℓ_1 and ℓ_0 penalties. (Received September 01, 2015)