1016-90-81 **Gabor Pataki*** (gabor@unc.edu), Department of Statistics and Operations, Research, CB #3260, UNC Chapel Hill, Chapel Hill, NC 27599-3260. *An exact characterization of badly behaved semidefinite systems.*

SDP's duality theory has been somewhat less well studied than its algorithmic aspects. Strong duality, – expected in linear programming fails in many cases, and the variety of how things can go wrong is bewildering: one can have nonattainment in either one of the primal and the dual problems, attainment on both sides, but a finite duality gap, etc.

The main result we present in this talk is a surprisingly simple, exact, "excluded minor" type characterization of all semidefinite systems that have a badly behaved dual for some objective function.

The characterization is based on some new, fundamental results in convex analysis on the closedness of the linear image of a closed convex cone. In particular, our result is a *necessary* condition for the closedness of the linear image – as opposed to the usual *sufficient* conditions, such as the existence of a Slater-point, or polyhedrality. Our conditions are necessary *and* sufficient, when the cone belongs to a large class, called *nice* cones.

Our closedness criteria lead to exact characterizations for other badly behaved conic programs as well, for instance second order cone programs. (Received February 01, 2006)