1163-90-963 **Diego Cifuentes***, 77 Massachusetts Avenue, Room 2-246C, Cambridge, MA 02139, and **Ankur Moitra**. *Polynomial time guarantees for the Burer-Monteiro method.*

The Burer-Monteiro method is one of the most widely used techniques for solving large-scale semidefinite programs (SDP). The basic idea is to solve a nonconvex program in Y, where Y is an $n \times p$ matrix such that $X = YY^T$. We show that this method can solve SDPs in polynomial time in an smoothed analysis setting. More precisely, we consider an SDP whose domain satisfies some compactness and smoothness assumptions, and slightly perturb the cost matrix and the constraints. We show that if $p \gtrsim \sqrt{(2+2\eta)m}$, where m is the number of constraints and $\eta > 0$ is any fixed constant, then the Burer-Monteiro method can solve SDPs to any desired accuracy in polynomial time, in the setting of smooth analysis. Our bound on p approaches the celebrated Barvinok-Pataki bound in the limit as η goes to zero, beneath which it is known that the nonconvex program can be suboptimal. (Received September 14, 2020)