

---

**HENRY WOLKOWICZ**, University of Waterloo  
*A Strengthened Barvinok-Pataki Bound on SDP Rank*

The Barvinok-Pataki bound provides an upper bound on the rank of extreme points of a spectrahedron. This bound depends solely on the number of affine constraints of the problem, i.e., on the algebra of the problem. Specifically, the triangular number of the rank  $r$  is upper bounded by the number of affine constraints. We revisit this bound and provide a strengthened upper bound on the rank using the singularity degree of the spectrahedron. Thus we bring in the geometry and stability of the spectrahedron, i.e., increased instability as seen by higher singularity degree, yields a lower, strengthened rank bound.