1106-68-1108 **Nicholas J.A. Harvey*** (nickhar@cs.ubc.ca) and **Neil Olver** (n.olver@vu.nl). *Matroid Bases and Matrix Concentration.*

Let x be a point in $[0,1]^m$ and let $M_1, \ldots, M_m$ be real, symmetric matrices of the same size. If we independently sampled $X_i \in \{0,1\}$ with $\mathbb{E}[X_i] = x_i$ then recently developed matrix concentration bounds imply that $\sum_i (X_i - x_i) M_i$ is probably "small".

Suppose we additionally know that x lies in a matroid base polytope. The independently-sampled point X would typically lie outside this polytope. We show that a dependent sampling process known as "pipage rounding" will produce a vertex Y of this polytope such that $\mathbb{E}[Y_i] = x_i$ and $\sum_i (Y_i - x_i) M_i$ obeys Tropp's matrix concentration bounds, just like in the independent case. This result has applications in spectral graph theory.

The proof of our result involves a new variant of Lieb's concavity theorem in matrix analysis, which may be of independent interest. (Received September 10, 2014)