

1155-15-387

Shmuel Friedland, Zehua Lai and Lek-Heng Lim* (lekheng@uchicago.edu). *Tensor norms and approximability*. Preliminary report.

It is common knowledge that tensor ranks play a key role in the *complexity* of various computational problems; we will see that tensor norms play an analogous role in the *approximability*. We show that for some important NP-hard problems, the obstruction to polynomial-time approximability is often given by an injective norm of an appropriate 3-tensor. Examples include the Goemans–Williamson constant in the approximation of the MAXCUT of a graph and the Grothendieck constant in the approximation of the $(\infty, 1)$ -norm of a matrix. Among other things, the Unique Games Conjecture can be decided if we know the exact value of a certain norm of a specific 3-tensor. (Received January 19, 2020)