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Mohsen Aliabadi* (maliab2@uic.edu), Chicago, IL , and **Shmuel Friedland**. *On the complexity of finding tensor ranks.*

It is a classical result that the rank of a matrix is polynomially computable, using the Gauss elimination. However for tensors, for finite fields the complexity of computation of the tensor rank is NP-complete. For general fields it is NP-hard. It is well understood that matrices are closely related to linear transformations, while tensors are closely related to polynomial maps. The purpose of this talk is to estimate the number of steps to find if a given linear system over integers or rational numbers is solvable in precise arithmetic. We provide a good answer to the problem of "finding an upper bound on complexity to find a rank of a tensor of integers or rationals". (Received January 20, 2020)