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*Topological inference of nonlinear rank.* Preliminary report.

The non-linear rank of a matrix is the minimal rank of a matrix that is acted by the group of row-wise nonlinear monotone transformations. Knowing the nonlinear rank is essential in many neuroscience and machine learning contexts, however a practical way of its computation has been unknown. It turns out that nonlinear rank can be efficiently estimated using topological methods.

In this talk I will explain how nonlinear rank relates to the geometry and topology of hyperplane arrangements. I will then describe a method for estimating the nonlinear rank via the computational topology techniques and illustrate its utility by estimating the dimension of the space of smells in a fly olfactory system. (Received July 24, 2017)