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Lipschitz Normal Embeddings in the Space of Matrices

The germ of an algebraic variety is naturally equipped with two different metrics up to bilipschitz equivalence. The inner metric and the outer metric. One calls a germ of a variety Lipschitz normally embedded if the two metrics are bilipschitz equivalent. We prove Lipschitz normal embeddedness of some algebraic subsets of the space of matrices. These include the space $m \times n$ matrices, symmetric matrices and skew-symmetric matrices of rank equal to a given number and their closures, and the upper triangular matrices with determinant 0. We also make a short discussion about generalizing these results to determinantal varieties in real and complex spaces.

This is a joint work with Dmitry Kerner and Helge Moeller Pedersen.