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Minimal Filling Architectures for Polynomial Neural Networks

Minimal filling architectures (MFAs) describe the smallest hidden-layer widths for which the neurovariety $\mathcal{V}_{\mathbf{d},r}$ of a polynomial neural network fills its ambient function space. The dimension of a neurovariety is an algebraic geometric measure of how expressive the neural network is. It was conjectured that every such architecture has unimodal hidden widths. In this talk, we describe counterexamples to this conjecture.

In the opposite direction, we report some results about MFAs related to this conjecture. Time permitting, we outline some computational results related to finding all MFAs efficiently, counts of MFAs, and other data. This is joint work (some of it in progress) with Jose Israel Rodriguez.