

TORIC IDEALS OF NEURAL CODES

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A neural code is a collection of codewords (binary vectors) of a given length n ; it captures the co-firing patterns of a set of neurons. A neural code is convexly realizable if there exist n convex sets in some \mathbb{R}^d so that each codeword in the code corresponds to a unique intersection carved out by the convex sets. There are some methods to determine whether a neural code is convexly realizable; however, these methods generally do not describe how to draw a realization. In this work, we construct toric ideals from neural codes, and we show how these and the related neural ideals are helpful in applying the theory of piercings from the field of information visualization.

Joint work with Elizabeth Gross (San Jose State University) and Nida Obatake (San Jose State University).