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Detecting inductively pierced neural codes. Preliminary report.

A neural code is a collection of binary vectors that record the co-firing patterns of a set of neurons. For neural codes arising from place cells (neurons that respond to geographic stimulus) the stimulus space can be visualized as subset of \mathbb{R}^2 , covered by a collection of convex sets whose arrangement forms an Euler diagram for the code. For a given code, it is often possible to determine whether a convex realization exists in theory, but these methods rarely include a procedure for actually drawing a realization. For neural codes that are inductively pierced, however, such a realization is relatively easy to draw. In this talk, we look at the problem of determining whether a neural code is inductively pierced, using information extracted from the canonical form of the neural ideal for the code. In addition, we give sufficient conditions guaranteeing that the code can be drawn inductively with ellipses in \mathbb{R}^2 . (Received January 25, 2022)