1135-05-3099   **Alexander B Kunin*** (`abk170@psu.edu`), **Zvi H Rosen** and **Vladimir Itskov**. *The polar complex of hyperplane codes.*

Feed-forward codes, studied by Giusti et al., arise as the firing patterns of the output of a one layer feed-forward neural network, and are a special case of convex codes. We introduce hyperplane codes, a natural generalization of feed-forward codes. We construct a new object, the polar complex of a code, to extend results from Giusti et al. regarding obstructions to convexity. Moreover, we demonstrate several obstructions particular to hyperplane codes. Using results from discrete geometry, we demonstrate that the polar complex of a hyperplane code is extendably shellable, which subsumes the other properties thus far considered. We demonstrate that the polar complex arises naturally via the polarization of the neural ideal, as discussed in Jeffries et al., and draw some connections to oriented matroids for future work. (Received September 26, 2017)