

1112-94-290

Jessalyn Bolkema* (jessalyn.bolkema@huskers.unl.edu), **Katherine Morrison** and **Judy L. Walker**. *Graph Realizations of Polar Codes*. Preliminary report.

In 2008, Arikan introduced a powerful family of codes that he termed *polar codes*. These schemes are built on (and named for) the phenomenon of *channel polarization*: a mechanism for recursively combining N independent copies of a given channel into N distinct channels, some fraction of which are noiseless while the remaining channels are useless. The resulting coding scheme was the first to demonstrably achieve Shannon capacity on symmetric binary-input memoryless channels. While the first decoding algorithm proposed for polar codes was successive cancellation, there has been much interest recently in graph-based decoding algorithms for these codes. It has also been established that channel polarization is a very general phenomenon. We discuss families of graph realizations of polar codes, suitable for message-passing decoding algorithms. Graphical and algebraic properties of these families are addressed. Further, we consider the relevance of these properties to code performance. (Received August 06, 2015)