

Capacity Via Symmetry I: a New Proof for an Old Code

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You rely on codes to make your life less error prone every day. No phone, hard disk, or optical connection would work without them. But what makes a code good? It has long been known that if a code has a good “weight spectrum”, then it allows reliable transmission close to capacity. However, there are also other sufficient conditions: for polar codes, the proof that they are capacity achieving is “baked into” the construction itself; for codes based on sparse graphs, the error probability is a relatively simple function of the graph structure, allowing therefore to optimize the performance.

I will discuss one further property that makes codes good — sufficient symmetry!

Based on joint work with Kudekar, Kumar, Pfister, Sasoglu, and Urbanke.