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Householder Dice and Simple Finite-Sample Analysis of AMP without Conditionng

In this tutorial, I will present a simple framework for analyzing AMP-style algorithms without the customary conditioning argument. This approach is based on an adaptive and recursive factorization of Haar-distributed random matrices. The idea first appeared in the form of an algorithm, named Householder Dice, that allows one to efficiently simulate dynamics on dense random matrix ensembles with translation-invariant properties.

This tutorial aims to illustrate how this algorithmic concept can also be used as a straightforward proof technique that leads to a simple finite-sample characterizations of AMP dynamics.

Paper: https://arxiv.org/abs/2101.07464