1163-60-626   **Sarah Miracle**, **Amanda Pascoe Streib*** (`ampasco@super.org`) and **Noah Streib**. *Iterated Decomposition of Markov Chains.*

Markov chains are useful in a variety of areas of scientific computing, where they can provide a way to sample from complex probability distributions. The decomposition method allows one to analyze a Markov chain M in terms of simpler constituent Markov chains. This idea can be particularly useful when M can be decomposed iteratively into simpler and simpler pieces. However, for certain applications, the overhead from the classical decomposition theorem prohibits applying it iteratively. In this work, we develop a new decomposition theorem. We apply our new theorem iteratively and obtain nearly optimal bounds on the spectral gap of a widely studied Markov chain over biased permutations, providing a dramatic improvement on the analysis of this chain. (Received September 10, 2020)