

# Obtaining measure concentration from Markov contraction

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## Abstract

Concentration bounds for non-product, non-Haar measures are fairly recent: the first such result was obtained for contracting Markov chains by Marton in 1996. Since then, several other such results have been proved; with few exceptions, these rely on coupling techniques. Though coupling is of unquestionable utility as a theoretical tool, it appears to have some limitations. Coupling has yet to be used to obtain bounds for more general Markov-type processes: hidden (or partially observed) Markov chains, Markov trees, etc. As an alternative to coupling, we apply the elementary Markov contraction lemma in a novel way, to obtain simple, useful, and apparently new concentration results for the various Markov-type processes. Our technique is generic and holds the potential to yield numerous results in this vein.