1134-20-50 **John Rhodes** and **Anne Schilling*** (anne@math.ucdavis.edu), Department of Mathematics, University of California, One Shields Avenue, Davis, CA 95661. *Grand unified theory for Tsetlin libraries.* Preliminary report.

We provide a unified framework to construct and analyze Markov chains for finite semigroups S with specified generators after two expansions are applied to S. We assume that the first expansion applied to S is stable under the second expansion. The original Tsetlin library is obtained by applying the expansions to $P(n)$. Our set-up vastly generalizes previous work involving left-regular bands by Brown and Diaconis and later R-trivial semigroups by Ayyer, Steinberg, Thiéry and the second author. We use the Karnofsky–Rhodes expansion of the right Cayley graph of S in terms of generators for the first expansion and the McCammond expansion to construct normal forms for elements in the expanded S as the second expansion. Using our previous work with Silva, we construct (infinite) semaphore codes on which we can define Markov chains. Under our assumptions, these semaphore codes can be lumped using Kleene expressions which yield the stationary distribution of the finite Markov chain of the expanded S. (Received September 05, 2017)