1135-05-2882 **Ewin N Tang*** (ewin@utexas.edu), **Neeraja R Kulkarni** (kulkarnin@carleton.edu) and **Joe Suk** (ybjosuk@gmail.com). *Factorizations of k-nonnegative matrices.*

A matrix is *totally nonnegative* if all of its minors are nonnegative. Totally nonnegative matrices have long attracted attention because of their applications in combinatorics, dynamics and probability, as well as their interesting topological structure. In particular, the semigroup of invertible totally nonnegative matrices can be partitioned, based on their factorizations into Chevalley generators and diagonal matrices, into cells that form a CW-complex. The closure poset of this CW-complex is described by the Bruhat order, as seen by considering subwords of factorizations.

Our work considers k-*nonnegative* matrices, in which all minors of order at most k are nonnegative. We give a minimal set of generators in two special cases: $(n-1)$-nonnegative invertible matrices, and $(n-2)$-nonnegative triangular matrices with 1s on the diagonal. We describe how these semigroups can also be partitioned into cells that are homeomorphic to open balls. By describing the subwords that arise naturally from our new generators, we extend the Bruhat order on totally nonnegative matrices to these cases. As a result, the topological closure of the cells of k-nonnegative matrices induces an easily describable, analogous poset. (Received September 26, 2017)