k-foldability of words

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Joint Work with Garner Cochran, Wei Gao, Lauren Keough, Rachel Kirsch, Mitch Phillipson, Danny Rorabaugh, Heather Smith, and Jennifer Wise

We extend results regarding a combinatorial model introduced by Black et al. (2017) which generalizes the folding of the RNA molecule in biology. Consider a word on alphabet $\{A_1, \overline{A_1}, \ldots, A_m, \overline{A_m}\}$ in which $\overline{A_i}$ is called the *complement* of A_i. A word w is foldable if it can be wrapped around a rooted plane tree T, starting at the root and working counterclockwise such that one letter labels each half edge and the two letters labelling the same edge are complements. The tree T is called w-valid. We define a bijection between edge-colored plane trees and words folded onto trees. This bijection is used to characterize and enumerate words for which there is only one valid tree, as well as those for which there exist exactly two valid trees.

Keywords: Plane trees, Non-crossing perfect matchings

This abstract is for a talk to be given in the session on research from the GRWC.