

1138-05-56

Shuliang Bai*, 519 saluda ave, apt 3. *Analogies between the crossing number and the tangle crossing number.*

Tanglegrams are special graphs that consist of a pair of rooted binary trees with the same number of leaves, and a perfect matching between the two leaf-sets. These objects are of use in phylogenetics and are represented with straightline drawings where the leaves of the two plane binary trees are on two parallel lines and only the matching edges can cross. The tangle crossing number of a tanglegram is the minimum crossing number over all such drawings and is related to biologically relevant quantities, such as the number of times a parasite switched hosts. In this talk we present results for tanglegrams, which have parallels for the crossing number of graphs. We show that removing any matching edge from a tanglegram with n leaves results in a drop of the tangle crossing number by at most $n - 3$, and this is sharp. We also show that the maximum tangle crossing number of a tanglegram with n leaves is asymptotically $n(n - 1)/4$. Finally we present an algorithm for computing non-trivial lower bounds on the tangle crossing number in $O(n^4)$ time. Joint work with R. Anderson, F. Barrera-Cruz, É. Czabarka, G. da Lozzo, N.L.F. Hobson, J.C.-H. Lin, A. Mohr, H.C. Smith, L.A. Székely, H. Whitlatch. (Received January 26, 2018)