1123-05-106 **Eva Czabarka*** (czabarka@math.sc.edu), **Laszlo A. Szekely** and **Stephan Wagner**.

Inducibility in binary trees and tanglegram crossing numbers.

For a rooted binary tree on n leaves, any subset of k leaves induces a rooted binary tree by taking all paths connecting these leaves, placing the new root on the vertex closest to the original root of the tree, and suppressing all non-root degree two vertices in the resulting tree. The inducibility of a k-leaf rooted binary tree in another rooted binary tree is the proportion of k-subsets of leaves that induce a tree isomorphic to that tree; the inducibility of any rooted binary tree is the limit superior of it inducibility in any sequence of binary trees increasing in size. A tanglegram is a pair of rooted binary trees on the same number of leaves with a fixed matching on the leaves; its crossing number is the minimum number of crossings we can have when we draw this in the plane such that only edges in the matching are allowed to cross. The tanglegram crossing number is used to estimate relevant biological quantities (e.g. in parasite-host trees). We prove some results on the inducibility of certain classes of binary trees, and use some of the to show that the expected value of tangregram crossing number in a random tanglegram on n-leaf trees is $\Theta(n^2)$, i.e. as large as possible. (Received August 20, 2016)