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Counting Weakly Bi-Colored Trees

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Abstract: A weakly bi-colored tree is a tree where the vertices are colored with two colors, say red and blue. Adjacent vertices can both be blue, but cannot both be red. Weakly bi-colored trees that are orientation-preserving under a homeomorphism of the plane are a combinatorial way of classifying critical portraits of Julia sets for complex polynomials. There are certain conditions that can be placed on the arrangement of these trees that allow a simpler partial count to be found, which can be used to build to the full general count. The different types of arrangement are fans, chains, caterpillars, and lobsters. Counts have been established for fans and chains. Currently, the count for caterpillars is being explored. The operating assumption is that the counting of caterpillars will lead to a count for lobsters, which will allow for the counting of super-lobsters. Every tree is representable as a super-lobster. In this talk, we will discuss in more detail the classification of weakly bi-colored trees, briefly illustrate the correspondence, and explain the partial counts already found and those currently being explored.