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Structural submodularity and tangles in abstract separation systems. (English)


Summary: We prove a tree-of-tangles theorem and a tangle-tree duality theorem for abstract separation systems $\mathcal{S}$ that are submodular in the structural sense that, for every pair of oriented separations, $\mathcal{S}$ contains either their meet or their join defined in some universe $\mathcal{U}$ of separations containing $\mathcal{S}$.

This holds, and is widely used, if $\mathcal{U}$ comes with a submodular order function and $\mathcal{S}$ consists of all its separations up to some fixed order. Our result is that for the proofs of these two theorems, which are central to abstract tangle theory, it suffices to assume the above structural consequence for $\mathcal{S}$, and no order function is needed.

MSC:

05C70 Edge subsets with special properties (factorization, matching, partitioning, covering and packing, etc.)
05C05 Trees
05C83 Graph minors

Keywords:
abstract separation systems; tree-decompositions; graph minors; tangles; cluster analysis; phylogenetic trees

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References:


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