

# **Title: Learnability and Definability in Trees and Similar Structures**

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**Abstract:** We prove upper bounds for combinatorial parameters of finite relational structures, related to the complexity of learning a definable set. We show that monadic second order (MSO) formulas with parameters have bounded VC-dimension over structures of bounded clique-width, and first-order formulas with parameters have bounded VC-dimension over structures of bounded local clique-width (this includes planar graphs). We also show that MSO formulas of a fixed size have bounded strong consistency dimension over MSO formulas of a fixed larger size, for colored trees. These bounds imply positive learnability results for the PAC and equivalence query learnability of a definable set over these structures. The proofs are based on bounds for related definability problems for tree automata.

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