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Daniel Bienstock* (dano@columbia.edu), Dept of IEOR, 500 W 120th St, New York, NY 10027. *Optimization problems with bounded width*. Preliminary report.

In recent work we have presented results on polynomial optimization problems whose intersection graph has fixed treewidth. Treewidth, via approximate discretization, yields linear programming formulations that provide provably good approximation and polynomial size. In this talk we will describe applications of these ideas to machine learning. A basic result is that given a fixed network, one can provide a uniform (i.e. universal) linear program such that any realization of training data gives rise to a face of the associated polyhedron; solving the optimization problem over that face yields a provably good approximation to training error. Joint work with G. Munoz (Montreal) and S. Pokutta (Georgia Tech). (Received September 13, 2018)