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New Geometric Representations and Domination Problems on Tolerance and Multitolerance Graphs

In this talk we introduce two new geometric representations for tolerance and multitolerance graphs, given by points and line-segments in the plane. Using these representations, we surprisingly prove that the dominating set problem can be solved in polynomial time on tolerance graphs and that it is APX-hard on multitolerance graphs, thus solving a longstanding open problem. This is the first known problem with a different complexity status in these two graph classes. Furthermore we demonstrate the potential of these representations for further exploitation via sweep-line algorithms by presenting a polynomial-time algorithm for the independent dominating set problem on multitolerance graphs.