

"Chordal" package: Exploiting graphical structure in polynomial ideals

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The sparsity structure of a polynomial system is often described by a graph that captures the interactions among the variables. By carefully exploiting the properties of this graph (in particular, its chordal completions), more efficient algorithms can be developed. The Macaulay2 package "Chordal" provides several specialized routines for computing properties of sparse polynomial ideals, such as: dimension, root count, membership, elimination, components. At the heart of our methods is a new representation of polynomial ideals that we call Chordal Networks. The package "Chordal" outperforms standard techniques by orders of magnitude in several interesting applications.