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Holes and Chordal Graphs

A hole on (reflexive) graph H is the lack of a vertex within specified distances of some the vertices of H. If a retraction exists of G, a supergraph of H, to H, then all holes on H must also be holes on G; note that this condition is necessary but not sufficient for the the existence of a retraction of G to H. The graphs H for which this necessary condition for a retraction of G to H is also sufficient are called absolute retracts with respect to holes. This generalises the well studied class of absolute retracts with respect to isomorphism.

Chordal graph have numerous useful properties due their highly structured nature. We will exploit (monophonic) convexity properties of chordal graphs to show that a hole on a chordal graph implies the existence of a hole base—a particular kind of chordal graph—as an induced subgraph, and moreover, that these hole bases can be used as building blocks of a kind of absolute retract with respect to holes.