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Reconstructing C_4-free graphs from their digital convexity

Fomin, Kratochvíl, Lokshtanov, Mancini, and Telle showed that every C_4-free graph is reconstructible from the multiset of closed neighborhoods. We strengthen their result, proving that every C_4-free graph is reconstructible from the *set* of closed neighborhoods. A subset S of vertices in a graph G is digitally convex if, for every $v \notin S$, there is a private neighbor of v with respect to S. We establish that reconstruction from digitally convex sets is equivalent to reconstruction from the set of closed neighborhoods, thereby extending the work of Lafrance, Oellermann, and Pressey by showing that all C_4-free graphs, and hence all graphs of girth at least five, are reconstructible from their digitally convexity.

This is joint work with Steffen Borgwardt, Ce Chen, Wayne Ge, Stephen G. Hartke, Yixuan Huang and Alex Moon.