

# On the 2-join decomposition

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## Abstract

A 2-join in a graph  $G = (V, E)$  (as defined by Fabien De Montgolfier) is a partition  $V', V''$  of  $V$  such that there is a subset  $W'$  of  $V'$  and a subset  $W''$  of  $V''$  for which the edges between  $V'$  and  $V''$  in  $G$  are exactly the edges between  $W'$  and  $W''$  or the edges between  $V' - W'$  and  $V'' - W''$ . The 2-join decomposition can thus be defined as a generalization of the modular decomposition.

We present a characterization of the class of graphs that are completely decomposable by the 2-join decomposition.

We also show that the clique-width of a graph  $G$  is bounded if all the primes graphs in the split decomposition or all the prime graphs in the 2-join decomposition of  $G$  have bounded clique-width.