Width parameters and graph classes: the case of mim-width

Andrea Munaro
Queen's University Belfast
a.munaro@qub.ac.uk

Flavia Bonomo-Braberman
Universidad de Buenos Aires
fbonomo@dc.uba.ar

Nick Brettell
Victoria University of Wellington
nick.brettell@vuw.ac.nz

Daniël Paulusma
Durham University
daniel.paulusma@durham.ac.uk

Jake Horsfield
University of Leeds
sc15jh@leeds.ac.uk

Giacomo Paesani
Durham University
giacomo.paesani@durham.ac.uk

A large number of NP-hard graph problems become polynomial-time solvable on graph classes where the mim-width is bounded and quickly computable. Hence, when solving such problems on special graph classes, it is helpful to know whether the graph class under consideration has bounded mim-width. We extend the toolkit for proving (un)boundedness of mim-width of graph classes and initiate a systematic study into bounding mim-width from the perspective of hereditary graph classes. We present summary theorems of the current state of the art for the boundedness of mim-width for (H_1, H_2)-free graphs and observe several interesting consequences. We also study the mim-width of generalized convex graphs. This allows us to re-prove and strengthen a large number of known results.