

ISOLATION OF GRAPHS

PETER BORG

University of Malta

e-mail: peter.borg@um.edu.mt

Given a set \mathcal{F} of graphs, we call a copy of a graph in \mathcal{F} an \mathcal{F} -graph. The \mathcal{F} -isolation number of a graph G , denoted by $\iota(G, \mathcal{F})$, is the size of a smallest subset D of the vertex set $V(G)$ such that the closed neighbourhood $N[D]$ of D intersects the vertex sets of the \mathcal{F} -graphs contained by G (equivalently, $G - N[D]$ contains no \mathcal{F} -graph). When \mathcal{F} consists of a 1-clique, $\iota(G, \mathcal{F})$ is the domination number of G . When \mathcal{F} consists of a 2-clique, $\iota(G, \mathcal{F})$ is the vertex-edge domination number of G . The general \mathcal{F} -isolation problem was introduced by Caro and Hansberg [10] in 2017. They established many results on \mathcal{F} -isolation numbers and posed several problems. Solutions will be presented together with most of the isolation results to date.

References

- [1] P. Borg, Isolation of cycles, *Graphs and Combinatorics* 36 (2020), 631–637.
- [2] P. Borg, K. Fenech and P. Kaemawichanurat, Isolation of k -cliques, *Discrete Mathematics* 343 (2020), paper 111879.
- [3] P. Borg, K. Fenech and P. Kaemawichanurat, Isolation of k -cliques II, *Discrete Mathematics* 345 (2022), paper 112641.
- [4] P. Borg and P. Kaemawichanurat, Extensions of the Art Gallery Theorem, *Annals of Combinatorics* 27 (2023), 31–50.
- [5] P. Borg, Isolation of connected graphs, *Discrete Applied Mathematics* 339 (2023), 154–165.
- [6] P. Borg, Isolation of regular graphs, stars and k -chromatic graphs, arXiv:2303.13709 [math.CO].
- [7] P. Borg, Isolation of regular graphs and k -chromatic graphs, arXiv:2304.10659 [math.CO].
- [8] P. Borg, K. Bartolo and D. Scicluna, Isolation of squares in graphs, arXiv:2310.09128 [math.CO].

- [9] G. Boyer and W. Goddard, Disjoint isolating sets and graphs with maximum isolation number, arXiv:2401.03933 [math.CO].
- [10] Y. Caro and A. Hansberg, Partial domination - the isolation number of a graph, *FiloMath* 31:12 (2017), 3925–3944.
- [11] M. Lemańska, M. Mora and M.J. Souto–Salorio, Graphs with isolation number equal to one third of the order, *Discrete Mathematics* 347 (2024), paper 113903.
- [12] G. Zhang and B. Wu, $K_{1,2}$ -isolation in graphs, *Discrete Applied Mathematics* 304 (2021), 365–374.
- [13] P. Żyliński, Vertex-edge domination in graphs, *Aequationes Mathematicae* 93 (2019), 735–742.