

# PROPER 2-CONNECTION NUMBER FOR SEVERAL GRAPH CLASSES

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The concept of *proper connection* of graphs is an extension of proper colouring and is motivated by rainbow connection of graphs. Andrews et al.[1] and, independently, Borozan et al.[2] introduced the concept of proper connection number as following: A path in an edge-coloured graph  $G$  is called a *properly coloured path* if every two consecutive edges receive distinct colours. The edge-coloured graph  $G$  is called *properly  $k$ -connected* if every two vertices are connected by at least  $k$  internally pairwise vertex-disjoint properly coloured paths. The *proper  $k$ -connection number* of  $G$ , denoted by  $pc_k(G)$ , is the smallest number of colours that are needed in order to make  $G$  properly  $k$ -connected.

For  $k = 2$ , we call  $pc_2(G)$  as the proper 2-connection number of  $G$ . It follows from the definition above that  $pc_2(G) \geq 2$ . In this talk, we study some classes of graphs with proper 2-connection number two.

## References

- [1] E. Andrews, C. Lumduanhom, E. Laforge, and P. Zhang, On Proper-Path colourings in Graphs, *Journal of Combinatorial Mathematics and Combinatorial Computing* **97** (2016) 189–207.
- [2] V. Borozan, S. Fujita, A. Gerek, C. Magnant, Y. Manoussakis, L. Montero, and Z. Tuza, Proper connection of graphs, *Discrete Math.* **312(17)** (2012) 2550–2560.