

# Magdalena Prorok

AGH University of Science and Technology

## DISTINGUISHING SYMMETRIC DIGRAPHS BY PROPER ARC-COLOURINGS OF TYPE I

A symmetric digraph  $\overleftrightarrow{G}$  results from a graph  $G$  by converting each edge  $uv$  into a pair of arcs  $\overrightarrow{uv}$  and  $\overrightarrow{vu}$ . We say that an arc-colouring  $c$  breaks an automorphism  $\varphi$  of  $\overleftrightarrow{G}$  if there exists an arc  $\overrightarrow{uv}$  whose colour is different from the colour of its image by  $\varphi$ . A colouring is distinguishing if it breaks all non-trivial automorphisms. A distinguishing chromatic index of a digraph  $\overleftrightarrow{G}$  is the least number of colours in a distinguishing proper arc-colouring of  $\overleftrightarrow{G}$ .

There are several possible definitions of a proper colouring of a digraph since there are several possible definitions of adjacency of arcs. In this talk, we study the case when monochromatic 2-cycles and 2-paths are forbidden (in literature, this is usually called a proper colouring of type I). For such proper colourings, Poljak and Rödl [2] determined the chromatic index of a symmetric digraph  $\overleftrightarrow{G}$  depending on the chromatic number of the underlying graph  $G$ . We prove optimal upper bounds for the distinguishing chromatic index of  $\overleftrightarrow{G}$  with respect to the maximum degree of  $G$ .

This is joint work with Rafał Kalinowski, and Monika Piłśniak.

## References

- [1] R. Kalinowski, M. Piłśniak, M. Prorok, *Distinguishing symmetric digraphs by proper arc-colourings without monochromatic 2-paths*, manuscript.
- [2] S. Poljak, V. Rödl, *On the Arc-Chromatic Number of a Digraph*, Journal of Combinatorial Theory Ser. B 31, 1981, pp. 190–198.