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# Graphs with small distinguishing index

\titleoftalk{Graphs with small distinguishing index}
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\begin{abstract}The distinguishing index of˜a graph $G$, denoted by $D'(G)$, is the˜least number of˜colours in a general edge colouring of˜$G$ not preserved by any non-trivial automorphism. The definition of˜$D'(G)$ was introduced in 2015 in [3] as an analogue of the distinguishing number defined by Albertson and Collins for vertex colouring, the concept of which spawned more than a hundred of papers.
For connected graphs in general, we showed in [3] that $D'(G) \leq \Delta(G)$ unless $G$ is $C_3$, $C_4$ or $C_5$. It was proved in [5],
that the equality $D'(G) = \Delta(G)$ holds only for cycles of˜length at least 6, for $K_4$, $K_{3,3}$ and for all symmetric and bisymmetric trees, i.e., $D'(G) < \Delta(G)$ for all other connected graphs.
%\vspace{.3cm}

Interestingly, there are some wide classes of graphs with the distinguishing index bounded by a small constant, e.g., traceable graphs, planar graphs, claw-free graphs [5], Cartesian powers [2], and the Cartesian product of denumerable graphs [1].
\vspace{0.3cm}

An analogous concept was also investigated for proper total colourings in [4]. We
proved in particular that if $G$ is a˜connected graph such that its total chromatic index $\chi''(G)$ satisfies $\chi''(G) \geq \Delta(G) + 2$, then the total distinguishing chromatic index equals $\chi''(G)$.

\vspace{25pt}

\setlength{\parindent}{0cm}{\textbf{References:}
% Journal paper

[1] I. Broere, M. Pil\'sniak, {\it The distinguishing index of the Cartesian product of countable graphs}, Ars Math. Contemp. 13 (2017) 15–21.

[2] A. Gorzkowska, R. Kalinowski, M. Pil\'sniak, {\it The distinguishing index of the Cartesian product of graphs}, Ars Math. Contemp. 12 (2017) 77–-87.

[3] R.˜Kalinowski and M.˜Pil\'sniak, {\it Distinguishing graphs by edge colourings}, {European J. Combin.} {45} (2015) 124–131.

[4] R. Kalinowski, M. Pil\'sniak, M. Wo\'zniak, {\it Distinguishing graphs by total colourings}, {Ars Math. Contemp.}, (2016) 11:79–-89.

[5] M.˜Pil\'sniak, {\it Improving Upper Bounds for the˜Distinguishing Index}, {Ars Math. Contemp.} 13 (2017) 259–274.
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\end{abstract}

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