Institut für Optimierung und Diskrete Mathematik

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Edge Intersection Graphs of Paths on a Grid

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This talk is based on an article of Martin Charles Golumbic, Marina Lipshteyn and Michal Stern.

Let $\mathcal{P}$ be a collection of paths on a grid $\mathcal{G}$. Then the *edge intersection graph EPG($\mathcal{P}$)* is a graph, in which the vertices correspond to the paths in $\mathcal{P}$ and there is an edge between two vertices, if the corresponding paths share an edge in the grid $\mathcal{G}$. An undirected graph G is an *edge intersection graph of paths on a grid* (EPG), if there exist a grid $\mathcal{G}$ and a collection of paths $\mathcal{P}$ such that $G = EPG(\mathcal{P})$. We call $\langle \mathcal{P}, \mathcal{G} \rangle$ an *EPG representation* of G.

We will see that every graph is EPG. Then we will consider special cases of EPG representations, namely B_1-EPG representations, in which every path of $\mathcal{P}$ is only allowed to have one single bend, i.e. one single turn in the grid. Some of the main results of the paper are that every tree has a B_1-EPG representation and that there are graphs that do not have a B_1-EPG representation.

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