Proper circular arc graphs as intersection graphs of paths ton a grid

Expositor: María Pía Mazzoleni (Universidad Nacional de La Plata, maria_pia_400@hotmail.com)

Autor/es: María Pía Mazzoleni (Universidad Nacional de La Plata, maria_pia_400@hotmail.com); Esther Galby (Universidad de Friburgo, esther.galby@unifr.ch); Bernard Ries (Universidad de Friburgo, bernard.ries@unifr.ch)

Golumbic et al. introduced the class of e*dge intersection graphs of paths on a grid* (*EPG graphs*), i.e. graphs for which there exists a collection of nontrivial paths on a rectangular grid in one-to-one correspondence with their vertex set, such that two vertices are adjacent if and only if the corresponding paths share at least one edge of the grid, and showed that every graph is in fact an EPG graph. A natural restriction which was thereupon considered, suggests to limit the number of bends (i.e. $90°$ turns at a grid-point) that a path may have; for $k \geq 0$, the class B_k-*EPG* consists of those EPG graphs admitting a representation in which each path has at most k bends.

A *circular arc graph* (*CA* graph) is an intersection graph of open arcs on a circle, i.e. a graph $G = (V, E)$ is a circular arc graph if one can associate an open arc on a circle with each vertex such that two vertices are adjacent if and only if their corresponding arcs intersect. If C denotes the corresponding circle and A the corresponding set of arcs, then $R = (C, A)$ is called a circular arc representation of G. A circular arc graph having a circular arc representation where no arc properly contains another is called a *proper circular arc graph* (*PCA* graph).

In this paper, we present a characterization by an infinite family of minimal forbidden induced subgraphs, of proper circular arc graphs which are intersection graphs of paths on a grid, where each path has at most one bend. That is, we present a characterization by an infinite family of minimal forbidden induced subgraphs for $B_1 - EPG \cap PCA$. This is a first step towards finding a characterization of the minimal graphs in $(CA \cap B_2 - EPG) \setminus (CA \cap B_1 - EPG)$.