

# Characterizations of special classes of contact $B_0$ -VPG graphs

Flavia Bonomo<sup>a</sup> María Pía Mazzoleni<sup>b</sup>  
Mariano Leonardo Rean<sup>a</sup> Bernard Ries<sup>c</sup>

<sup>a</sup> *Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales.  
Departamento de Computación. Buenos Aires, Argentina. /  
CONICET-Universidad de Buenos Aires. Instituto de Investigación en Ciencias  
de la Computación (ICC). Buenos Aires, Argentina.*

<sup>b</sup> *CONICET and Departamento de Matemática, FCE-UNLP. La Plata, Argentina.*

<sup>c</sup> *Department of Informatics, University of Fribourg. Fribourg, Switzerland.*

Golumbic et al. introduced the concept of *vertex intersection graphs of paths in a grid* (referred to as *VPG graphs*). An undirected graph  $G = (V, E)$  is called a VPG graph if one can associate a path in a rectangular grid with each vertex such that two vertices are adjacent if and only if the corresponding paths intersect on at least one grid-point.

A particular attention was paid to the case where the paths have a limited number of bends. An undirected graph  $G = (V, E)$  is then called a  $B_k$ -VPG graph, for some integer  $k \geq 0$ , if one can associate a path with at most  $k$  bends in a rectangular grid with each vertex such that two vertices are adjacent if and only if the corresponding paths intersect on at least one grid-point.

A graph  $G$  is a  $B_0$ -VPG graph if it is the vertex intersection graph of horizontal and vertical paths in a grid. In this work, we are interested in a subclass of  $B_0$ -VPG graphs called *contact  $B_0$ -VPG*. An undirected graph  $G = (V, E)$  is said to be contact  $B_0$ -VPG if one can associate a horizontal or vertical path in a rectangular grid with each vertex, such that two vertices are adjacent if and only if the corresponding paths intersect on at least one grid-point without crossing each other and without sharing an edge of the grid. We present a minimal forbidden induced subgraph characterization of contact  $B_0$ -VPG graphs within some special graph classes. More specifically, we consider tree-cographs,  $P_4$ -tidy graphs,  $(1, 2)$ -polar graphs and chordal graphs, and we characterize those graphs from these families that are contact  $B_0$ -VPG.