ON THE RECOGNITION OF PC-GRAPHS WITH HIGH GIRTH

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Intersection graphs are graphs having representations by set-systems of certain types. Each set corresponds to a vertex and two vertices are adjacent whenever the corresponding sets have nonempty intersection. As for each graph can be generated some intersection representation [3], we are interested only in some particular classes. The recognition problem (to decide whether a given graph has an appropriate intersection representation) is a very important problem, as several efficient algorithms solving generally hard problems require this representation.
Polygon-circle (or PC) graphs are intersection graphs of polygons inscribed into a circle in a plane [4]. PC-graphs generalize many other intersection-defined classes (e.g., interval graphs, circle graphs, circular-arc graphs) whose recognition problem is known to be polynomially solvable. As it is known a polynomial algorithm [1] finding maximum weight clique and independent set even for graphs of interval filaments (generalization of PC-graphs), while in [2] it is proved that PC-graphs are near-perfect, it is important to ask, how efficiently can this class be recognized.
We introduce a polynomial-time algorithm for the recognition of polygon-circle graphs with girth at least 5, as well we establish polynomial reduction showing that the general recognition problem (for PC-graphs) is NP-complete.

References

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