

When all holes have the same length

Cléopée Robin (G-SCOP, Grenoble)

A *hole* is an induced cycle of length at least 4. For an integer $k \geq 4$, we denote by \mathcal{C}_k , the class of graphs where every hole has length k .

We have defined a new class of graphs, named *blowup of ℓ -templates*, all whose holes have length $2\ell + 1$. Using earlier results on other related classes of graphs, we obtain the following structural theorem:

Theorem. *Let $\ell \geq 3$ be an integer. If G is a graph in $\mathcal{C}_{2\ell+1}$ then one of the following holds:*

- G is a ring of length $2\ell + 1$,
- G is a proper blowup of a twinless odd ℓ -template,
- G has a universal vertex,
- G has a clique cutset.

The classes of perfect graphs and even-hole-free graphs both exclude holes depending on the parity of their length. For an even $k \geq 6$, \mathcal{C}_k is a subclass of the class of perfect graphs, and for an odd k , \mathcal{C}_k is a subclass of even-hole-free graphs. The well-known class of chordal graphs (graphs containing no hole) is trivially included in every \mathcal{C}_k .

This talk is based on joint work with Jake Horsfield, Myriam Preissmann, Nicolas Trotignon, Ni Luh Dewi Sintiari, and Kristina Vušković. Linda Cook and Paul Seymour independently found a similar characterization.