Chordal graphs with bounded tree-width

04.07 **Clément Requilé**
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Abstract: A graph is chordal when every induced cycle of length at least four admits a chord, or equivalently when every separator is a clique. A remarkable class of chordal graphs are the k-trees, that are build as follows: start from a $(k+1)$-clique, add a vertex connected to all vertices of some subclique of size k, then repeat this process at will on the resulting graph. Interestingly, this class allows for an alternative definition of tree-width: a graph has tree-width at most k if it is the subgraph of a k-tree.

This talk will be about the enumeration of chordal graphs with bounded tree-width. In fact, the asymptotic number of k-connected chordal graphs with n labelled vertices and tree-width at most t is of the form $cn^{-5/2}\gamma^n n!$, for some constants c and γ depending on t and k. This result is valid for any $t \geq 2$ and $0 \leq k \leq t$, and we compute γ for small values of t. We will also discuss the normal limiting distribution of the number of i-cliques ($i \leq t+1$) of a random graph in this class. Both results fit into the framework of families of graphs that are subcritical.

Joint work with Jordi Castellví, Michael Drmota and Marc Noy.