# On the number of hamiltonian cycles in triangulations with few separating triangles

Nico Van Cleemput
Ghent University, Krijgslaan 281 - S9 - WE02, 9000 Ghent, Belgium

In 1931 Whitney proved that each triangulation containing no “separating triangles” is hamiltonian. One way how this classical result can be improved is to use the same prerequisites but prove a stronger lower bound for the number of cycles. The strongest result about the number of hamiltonian cycles so far was due to Hakimi, Schmeichel and Thomassen. They prove that in a 4-connected triangulation with $n$ vertices there are at least $n/(\log_2 n)$ different hamiltonian cycles.
We introduce a new abstract counting technique for hamiltonian cycles in general graphs. This technique is based on a set of subgraphs, their overlap with the hamiltonian cycles and a switching function. Using this technique and the same subgraphs as Hakimi, Schmeichel and Thomassen used for their counting argument, we improved their bound to $\Omega(n)$. Using different types of subgraphs we were able to further improve the multiplicative and additive constants. We also show a linear bound in the case of plane triangulations with one separating triangle, and give computational results showing that the conjectured optimal value of $2n^2 - 12n + 16$ holds up to $n = 25$.
This is joint work with Gunnar Brinkmann, Annelies Cuvelier and Jasper Souffriau.