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**"Analysis, Geometry and Probability"**

# BOOK of ABSTRACTS

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interval exchange transformations satisfying the same set of restrictions.

To support our conjecture in the other direction we provide several series of rich sets of restrictions for which instability of minimal interval exchange transformations is either proved or observed experimentally.

The work is supported by the Russian Science Foundation under grant 14-50-00005 and performed in Steklov Mathematical Institute of Russian Academy of Sciences

## t-perfection of triangulations and quadrangulations of the projective plane

*Elke Fuchs*
*(Universität Ulm, Germany,* ANALYSIS, 20 min*)*

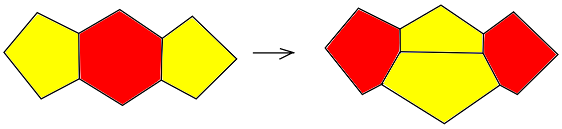
The class of t-perfect graphs is defined polyhedrally. A graph is called t-perfect if its stable set polytope is fully described by non-negativity, edge and odd-cycle constraints. We characterise t-perfection in quadrangulations and triangulations of the projective plane. This is joint work with Laura Gellert.

## Construction of fullerenes by truncations

*Nikolay Yu. Erokhovets*
*(Steklov Mathematical Institute of Russian Academy of Science,* GEOMETRY, 30 min*)*

The talk is based on the joint work with V.M. Buchstaber. The author is a Young Russian Mathematics award winner.

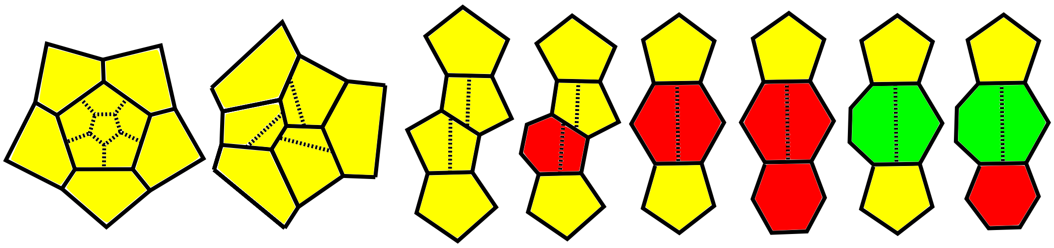
By a *fullerene* we mean a combinatorial simple 3-polytope with all facets pentagons and hexagons. This is a mathematical model for spherical shaped molecule of carbon with atoms linked into pentagonal and hexagonal rings (Nobel Prize 1996 in chemistry to Robert Curl, Harold Kroto, and Richard Smalley). The Euler formula implies that any fullerene has $p_5 = 12$ pentagons. It can be proved that the number $p_6$ of hexagons can be arbitrary except for one. The dodecahedron is combinatorially the only fullerene with $p_6 = 0$, while for large $p_6$ the number of combinatorial types of fullerenes grows like $p_6^9$. The well-known problem [1, 3] is to find a simple set of operations sufficient to construct arbitrary fullerene from the dodecahedron. The Endo-Kroto operation



is an example of a growth operation: it substitutes a new patch consisting of pentagons and hexagons for a patch on the fullerene with the same boundary and less number of vertices. It was proved in [1] that there is no finite set of growth operations sufficient to construct arbitrary fullerene. In [3] the example of an infinite set was found.

Let $\mathfrak{F}_s$ be the set of simple 3-polytopes which are either fullerenes or singular fullerenes with one **heptagon** adjacent to some pentagon, such that either there are two adjacent pentagons with the common edge intersecting the heptagon and a hexagon, or for any two adjacent pentagons exactly one is adjacent to the heptagon.

**Theorem** : *Any polytope in $\mathfrak{F}_s$ is combinatorially equivalent to a polytope that is obtained from the dodecahedron by a sequence of operations of the following types:*



*All these operations are compositions of edge and two-edges truncations (see [2]).*

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**References**

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[1] BE15 V.M. Buchstaber, N.Yu. Erokhovets. Construction of fullerenes. ArXiv: 1510.02948.

[1] HFM08 M. Hasheminezhad, H. Fleischner, B.D. McKay. A universal set of growth operations for fullerenes. Chem. Phys. Letters 464 (2008), 118–121.

## Jacobsthal numbers in generalised Petersen graphs

*Laura Kristin Gellert*
*(Universität Ulm, Germany,* ANALYSIS, 20 min*)*