



FIFTH  
INTERNATIONAL  
CONFERENCE  
ON ANALYTIC  
NUMBER THEORY  
AND SPATIAL  
TESSELLATIONS

SEPTEMBER 16–20, 2013  
NATIONAL PEDAGOGICAL DRAGOMANOV UNIVERSITY  
KYIV, UKRAINE

ABSTRACTS

Institute of Physics and Mathematics  
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George Voronoi Foundation

**Fifth International Conference  
on Analytic Number Theory  
and Spatial Tessellations**

September 16–20, 2013      Kyiv, Ukraine

Abstracts

Institute of Mathematics, NAS of Ukraine  
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**Fifth International Conference on Analytic Number Theory and Spatial Tessellations : Abstracts.** — Kyiv : Institute of Mathematics of National Academy of Sciences of Ukraine & Institute of Physics and Mathematics of the National Pedagogical Dragomanov University, 2013. — x + 126 p.

The proposed collection contains abstracts of the Fifth International Conference on Analytic Number Theory and Spatial Tessellations (September 16–20, 2013, Kyiv, Ukraine) devoted to the development of a scientific heritage of outstanding Ukrainian mathematician G. Voronoi (1868–1908). The conference covers the problems solved on the basis of the fundamental results by G. Voronoi: number theory, analysis, theoretical aspects and applications of Voronoi diagrams, and also includes some aspects of fractal analysis and fractal geometry.

The abstracts are intended for mathematicians and experts of many sciences and technology who use in their research the Voronoi methods, Voronoi results as well as for graduate students and senior students of the corresponding profiles.

**П'ята міжнародна конференція з аналітичної теорії чисел і просторових мозаїк : Тези доповідей.** — Київ : Інститут математики НАН України та Фізико-математичний інститут Національного педагогічного університету імені М. П. Драгоманова, 2013. — x + 126 с.

Збірник містить тези П'ятої міжнародної конференції з аналітичної теорії чисел і просторових мозаїк (16–20 вересня 2013 року, Київ, Україна), присвяченої розвитку наукового спадку видатного українського математика Георгія Вороного (1868–1908). Конференція охоплює проблеми, розв'язані на основі фундаментальних результатів Г. Вороного, з теорії чисел, аналізу, теоретичних аспектів і застосувань діаграм Вороного, а також включає деякі аспекти фрактального аналізу і фрактальної геометрії.

Тези призначені для математиків і фахівців у різноманітних сферах науки та техніки, які використовують у своїх дослідженнях методи й результати Вороного, а також для аспірантів і студентів відповідних спеціальностей.

As at the previous Voronoi conferences, the organizers has used for the emblem of the conference the following sources:

A. Okabe, B. Boots, K. Sugihara, and S. N. Chiu, *Spatial tessellations. Concepts and applications of Voronoi diagrams*, John Wiley, 2000, Figure 3.7.22.

R. E. Miles and R. J. Maillardet, *The basic structures of Voronoi and generalized Voronoi polygons*, J. Appl. Probab. **19A** (1982), 97–111, Figure 5.

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## Conference Organization Structure

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## Remarks

### Some remarks concerning Georges Voronoï's family name

Georges Voronoï was Ukrainian-born, his name in Ukrainian is Heorhiy Voronyi. Here we reproduce the transliteration of the scientist's name as he himself used it in his scientific papers, in particular as it was used in the most remarkable Voronoï's papers published in French in the *Journal für die reine und angewandte Mathematik*, see

<http://resolver.sub.uni-goettingen.de/purl?GDZPPN002166534>

<http://resolver.sub.uni-goettingen.de/purl?GDZPPN002166690>

<http://resolver.sub.uni-goettingen.de/purl?GDZPPN002166925>

The experts in the number theory usually use the spelling "Voronoï", however, in the area of Voronoi diagrams it is accepted to use the spelling "Voronoi".

G. Voronoï's father was registered as Theodosiy Voronyi at the list of the students of Kyiv St. Volodymyr University with symbol "Θ" in his first name Theodosiy. The symbol "Θ" was later on replaced by the letter "F" in the Russian alphabet and by the letter "T" in the Ukrainian alphabet. Therefore, there is some diversity in spelling of the full name of the scientist: Georges Feodosievich (Todosiyovych) Voronoï (Voronyi, Voronoi) in different publications.

We maintain a transliteration of names such as it is used by the author.

### A few words about citations of archival documents

Different countries have their own national archival informational system. For citations from the Ukrainian archives, references are given as follows: archival abbreviation, fund number (*фонд* in Ukrainian), inventory or series (*онуч* in Ukrainian) and file unit (*чпаса* in Ukrainian). *Онуч* is a series within a fund, it helps to find the required file unit (*чпаса*).

In publications, abbreviated forms of references are usually used:  $\Phi$ . (*Фонд*) No. ..., он. (*онуч*) No. ..., чп. (*чпаса*) No. ...

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ON  $\pi$ -SOLVABLE GROUP IN WHICH  
SOME MAXIMAL SUBGROUP OF  $\pi$ -HALL SUBGROUP  
IS MINIMAL NON-ABELIAN GROUP

DMITRY V. GRITSUK AND VICTOR S. MONAKHOV

All groups considered in this paper will be finite. All notation and definitions correspond to [1]. Let  $G$  be a  $\pi$ -solvable group. Then  $G$  has a subnormal series  $G = G_0 \supseteq G_1 \supseteq \dots \supseteq G_{n-1} \supseteq G_n = 1$ , whose factors  $G_{i-1}/G_i$  are  $\pi'$ -groups or abelian  $\pi$ -groups. The least number of abelian  $\pi$ -factors of all such subnormal series of a group  $G$  is called the derived  $\pi$ -length of a  $\pi$ -solvable group  $G$  and is denoted by  $l_\pi^a(G)$ . Clearly, if  $\pi = \pi(G)$ , then  $l_\pi^a(G)$  coincides with the derived length  $d(G)$  of  $G$ . The initial properties of the derived  $\pi$ -length established in [2].

Recall that a group is called a Miller–Moreno group if it is a non-abelian group and all of its proper subgroups are abelian. Nilpotent Miller–Moreno groups are the groups of prime-power order. Recall that a maximal subgroup of maximal subgroup of group is called a 2-maximal subgroup.

**Theorem 1.** *Let  $G$  be a  $\pi$ -solvable group. If some maximal subgroup  $M$  of  $\pi$ -Hall subgroup of  $G$  is Miller–Moreno group, then  $l_\pi^a(G) \leq 4$ . In particular, if  $M$  is a Hall subgroup, then  $l_\pi^a(G) \leq 3$ .*

**Corollary 1.** *Let  $G$  be a  $p$ -solvable group and let all 2-maximal subgroups of Sylow  $p$ -subgroup are abelian. Then  $l_p^a(G) \leq 4$ .*

**Corollary 2.** *If some maximal subgroup of a solvable group  $G$  is Miller–Moreno group, then  $d(G) \leq 4$ .*

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- [2] D. V. Gritsuk, V. S. Monakhov, and O. A. Spyrko, *On derived  $\pi$ -length of a  $\pi$ -solvable group*, BSU Vestnik. Ser. 1 (2012), no. 3, 90–95 (in Russian).

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