



POLISH NATIONAL AGENCY
FOR ACADEMIC EXCHANGE



STER
PROGRAMME

<p>name of the unit:</p> <p>GENERALIZED ITERATED FUNCTION SYSTEMS, SELECTED TOPICS IN FUNCTIONAL ANALYSIS</p> <p>Institute of Mathematics, Lodz University of Technology</p>		<p>symbol:</p> <p>I-73</p> <p>http://im.p.lodz.pl</p>
<p>head of the unit:</p> <p>Prof. Jacek Jachymski PhD, DSc</p>	<p>potential promoters:</p> <p>Filip Strobin, PhD, DSc, TUL Prof. Prof. Jacek Jachymski, PhD, DSc</p>	<p>contact person:</p> <p>Filip Strobin filip.strobin@p.lodz.pl</p>
<p>scope of activities:</p> <p>Iterated function systems and their generalizations, fractals, attractors, semiattractors, fuzzy attractors, algorithms generating images of attractors (e.g., deterministic chaos game), invariant measures, Markov operators, semimetric spaces, transformations of functions of distance type, metric fixed point theory, selected topics in functional analysis.</p>		<p>graphic material</p>
<p>present activities:</p> <p>Analysis of deterministic chaos game, existence of idempotent invariant measures, compactness criteria in metric and Banach spaces; properties between compactness and completeness.</p>		
<p>Future activities:</p> <p>Attractors of expansive iterated function systems, chaos game for fuzzy version of iterated function systems, porosity and Baire category of family of attractors, around the Josefson-Nissenzweig theorem; Banach limits, Hahn-Banach type theorems.</p>		
<p>Publications/patents, awards, projects (for the last 2 years):</p> <p>Krzysztof Leśniak, Nina Snigireva, Filip Strobin, <i>A fractal triangle arising in the AIMD dynamics</i>, Proceedings of the conference Contemporary Mathematics in Kielce 2020 (2021), 179-195</p> <p>R. D. da Cunha, E. R. Oliveira, Filip Strobin, <i>A multiresolution algorithm to generate images of generalized fuzzy fractal attractors</i>, Numer. Algorithms (100 pkt.) 86 (2021), 223-256</p> <p>Filip Strobin, <i>Contractive iterated function systems enriched with nonexpansive maps</i>, Results Math (100 pkt.) 76, art. nr 153 (2021), 30 pp.</p> <p>Filip Strobin, <i>On the existence of the Hutchinson measure for generalized iterated function systems</i>, Qual. Theory Dyn. Syst. (100 pkt.), 19 (3), art. nr 85 (2020), 21 pp.</p> <p>T. Banach, M. Nowak, Filip <u>Strobin</u>, <i>Embedding fractals in Banach, Hilbert or Euclidean spaces</i>, J. Fractal Geom. (70 pkt.) 7 (2020), 351-386</p> <p>Filip Strobin, J. Swaczyna, <i>Connectedness of attractors of a certain family of IFSs</i>, J. Fractal Geom. (70 pkt.) 7 (2020), 219-231</p> <p>R. D. da Cunha, E. R. Oliveira, Filip Strobin, <i>A multiresolution algorithm to approximate the Hutchinson measure for IFS and GIFS</i>, Commun. Nonlinear Sci. Numer. Simul. 91 (2020), 105423, 22 pp.</p>		



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K. Leśniak, N. Snigireva, Filip Strobil, *Weakly contractive iterated function systems and beyond: a manual*, J. Differ. Equ. Appl. (70 pkt.), 26, art. nr 8 (2020), 1114-1173 (**paper awarded in 2020 JDEA Best Paper**)

Jacek Jachymski, Filip Turoboś, *On functions preserving regular semimetrics and quasimetrics satisfying the relaxed polygonal inequality*, Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas RACSAM (100 pkt.), 114 (3), art. 159 (2020)

Keywords:

Iterated function systems, fractals, attractors, invariant measures, algorithms generating images of attractors, spaces with the distance-type function, Banach spaces, completely continuous mappings, renorming and remetrization.

List of internship proposal in this research team:

Cooperation in investigations of undertaken problems of iterated function systems theory, e.g.

- existence and the structure of attractors of wide classes of iterated function systems;
- analysis of algorithms generating images of attractors of iterated function systems;
- analysis of size and structure of family of attractors of iterated function systems.