NEWS AND NOTICES

JAN PELANT
(18.2.1950–11.4.2005)

B. Balcar, V. Müller, J. Nešetřil, P. Simon, Praha

Dr. Jan Pelant, an outstanding Czech mathematician, died on April 11, 2005.

Jan Pelant was born on February 18, 1950 in Prague. He studied mathematics at the Charles University where he graduated with honours in 1973 and later obtained the degree of RNDr. in general topology. Then he became a doctoral student of Miroslav Hušek. He received his CSc. degree (equivalent to PhD) in 1976. During his postgraduate study, he was strongly influenced by Zdeněk Frolík. He enthusiastically participated in Frolík's seminars on uniform spaces and on measure theory. He joined the Mathematical Institute of the Czechoslovak Academy of Sciences in 1976, where he worked for the rest of his life. In 1998 he defended his thesis for the degree of DrSc. (Doctor of Sciences).

His scientific interests included general topology, functional analysis and combinatorics. He published 90 research papers and was a coauthor of a successful monograph Functional Analysis and Infinite-Dimensional Geometry which was published by Springer Verlag in 2001. He also contributed to books Recent Progress in General Topology II (North-Holland 2002) and Encyclopedia of General Topology (Elsevier 2004).

Jan Pelant obtained his first results in combinatorics and graph theory, especially in algebraic combinatorics and the theory of tournaments. Later on, his main interest shifted to topology and functional analysis but even in these fields he often used combinatorial methods.

Jan's contribution to general topology had a very broad range, but the following four areas of general topology were the major ones: uniform spaces, compact spaces, spaces of continuous functions and hyperspaces.

The article has appeared also in Czechoslovak Math. J. with the approval of the authors.

There was a single text on uniform spaces, J. R. Isbell's classical monograph, at the time when Jan Pelant started his research. Ten years later, Jan solved almost all Isbell's open problems from the book.

The main tool introduced by him was the use of well-founded trees. That offerred a fruitful insight into the structure of uniform covers. Jan Pelant proved among other that locally fine uniform spaces coincide with subfine ones [36]. The technique of well-founded trees yielded also the following addition to Dugundji extension theorem [39]: Let X_i $(i \in I)$ be a family of metric spaces. Equip the product $\prod_{i \in I} X_i$ by the Tychonoff topology τ and by the G_δ-topology ϱ. If $X \subseteq \prod_{i \in I} X_i$ is ϱ-dense in its τ-closure, then every continuous mapping from X into a Banach space continuously extends to the whole product $\prod_{i \in I} X_i$. Recall that a uniformity is of point-finite character, if it has a basis consisting of point-finite covers. Jan Pelant's results [57] say that every $c_0(\Gamma)$ with a metric uniformity is of point-finite character and that every metric uniform space with point-finite character embeds uniformly into $c_0(\Gamma)$, where the size of Γ equals the density of the space in question. Moreover, one cannot ask for Lipschitz embedding in general.

All these results from uniform spaces have a rich area of applications, mainly in the theory of non-linear structure of Banach spaces.

In 1980, a joint paper [27] appeared, where Jan's contribution was substantial. The main result says that the Čech-Stone remainder of a countable discrete space has a tree π-base. This result was a key tool for the calculation of the Baire number of that remainder, and very soon found a wide area of applications both in topology and in set theory.

Let us denote by $C_p(X)$ the space of continuous real-valued functions on a topological space X with a topology of pointwise convergence. The principal results of Jan Pelant in this area include the following:

If $C_p(Y)$ is a linear continuous image of $C_p(X)$, then the complete metrizability of the space X implies the complete metrizability of Y [54]. This was formerly a problem asked by A. V. Arkhangel'skii.

A space X is called σ-relatively metacompact, if every open cover $\mathcal{P}$ of the space X has a refinement $\mathcal{S}$ which is σ-relatively discrete. This name was suggested in [68] as a more informative substitution for the previous "weakly θ-refinable". The paper contains examples of various spaces of functions, which negatively solve problems concerning covering properties of $C_p(X)$ posed by R. Hansell, A. V. Arkhangel'skii and S. P. Gul'ko. As an example, let us mention that the space $C_p(\beta\omega_1 \setminus U(\omega_1))$ is not σ-relatively metacompact. An affirmative statement says that if X is a one-point compactification of a tree, then $C_p(X)$ is hereditarily σ-metacompact. The last statement was used in [60] to answer a question of J. E. Jayne, whether weak topology of a Banach space, which is Radon, must be necessarily σ-fragmentable.

If X is a topological space, let us denote by $\mathcal{F}(X)$ the space of all non-empty closed subsets of X with Vietoris topology, a hyperspace. A continuous selection for closed sets is a continuous mapping $s\colon \mathcal{F}(X) \longrightarrow X$ such that $s(A) \in A$ for every $A \in \mathcal{F}(X)$. The existence of such a selection is a rather strong property: it was known (J. van Mill, E. Wattel) that compact spaces admitting continuous selection have a topology induced by a linear order. R. Engelking, R. W. Heath and E. Michael showed that a zero-dimensional completely metrizable space has a continuous selection for closed sets. Jan Pelant proved the converse implication: If a zero-dimensional metric space admits such a selection, then it is complete [63].

There are other interesting reasonable topologies on the set $\mathcal{F}(X)$. If the topology τ on X is metrizable, then the Vietoris topology on $\mathcal{F}(X)$ is the supremum of all Wijsman topologies, which are determined by metrics which induce τ (G. Beer, A. Lechicki, S. Levi, S. Naimpally). Pelant proved a counterpart to this statement: Under the same assumptions, the infimum of all those Wijsman topologies is a Kuratowski convergence κ, derived from τ [56]. Notice the essential detail: the infimum must be taken in the lattice of all convergences, because Kuratowski convergence is topological if and only if the topology of X is locally compact. If we take the infimum of all those Wijsman topologies in the lattice of all topologies, then we get a topological modification of Kuratowski convergence.

Dr. Pelant's theorems mentioned here constitute a small fragment of his mathematical activities. He had a gift to understand and solve problems and answer questions of other people during a brief conversation. Typically, Jan's contribution was so deep that the starting chat resulted in a respectable joint paper.

Jan Pelant's remarkable results did not remain unnoticed. In 1976, he received the first prize in the competition for young mathematicians from the Czechoslovak Union of Mathematics and Physicists. In 1980 and 1983, he was rewarded by the Board for Mathematics of the Czechoslovak Academy of Sciences and in 1999, he received Bolzano's medal for merits in mathematics from the Academy of Sciences of the Czech Republic.

Dr. Jan Pelant had scientific contacts with mathematicians all over the world. He repeatedly visited universities in Amsterdam, Torino, Toronto and Helsinki for longer stays and had extensive contacts with mathematicians in Italy, Poland, Netherlands, Canada, Finland and Mexico. His results were so interesting for the topological community and his lectures were always so excellent, that he was an invited main speaker in—up to our knowledge—at least 14 international conferences. He was member of editorial board of two international journals and was one of the main organizers of the traditional Winter Schools in Abstract Analysis and Topology and of the Prague Topological Symposia.

However, Jan Pelant was not just an expert in his own field. He had quite general education and certainly he could have been equally successful in other fields.

He had a remarkable sense of humour. This feature of his personality was obscured not even by his long disease, he was able to make jokes about his health problems till the last moment. In the younger days he used to be the center of any party. For example, he was giving traditional funny talks at Winter Schools. He was also a big star of the mathematical puppet theater "Hobbit" and was even the author of several pieces for this theater and of many verses—all of them full of absurd humour (as many participants of Toposym 1976 may remember).

But the most important that can be said about him—he was a good and fair man. His passing away is an immense loss for his many friends and colleagues and to the whole mathematical community.

List of publications of Jan Pelant

Books

[B1] Functional analysis and infinite-dimensional geometry. CMS Books in Mathematics/Ouvrages de Mathematiques de la SMC, 8, Springer, New York, 2001 (with M. Fabian, P. Habala, P. Hájek, V. Montesinos, V. Zizler).

[B2] Recent progress in hyperspace topologies. Recent Progress in General Topology II (M. Hušek, J. van Mill, eds.). Elsevier, Amsterdam, 2002, pp. 253–285 (with L. Holá).

Journal papers

[1] Either tournaments or algebras. Comment. Math. Univ. Carol. *13* (1972), 801–807 (with V. Müller, J. Nešetřil).

[2] On generating of relations. Comment. Math. Univ. Carol. *14* (1973), 95–105 (with V. Rödl). Zbl 257.05109

[3] Lattice of E-compact spaces. Comment. Math. Univ. Carol. *14* (1973), 719–738. Zbl 271.18004

[4] Note about atom categories of topological spaces. Comment. Math. Univ. Carol. *15* (1974), 767–773 (with M. Hušek). Zbl 289.54004

[5] On strongly homogeneous tournaments. Czechoslovak Math. J. *24* (1974), 378–391 (with V. Müller). Zbl 317.05109

[6] Either tournaments of algebras? Discrete Math. *11* (1975), 37–66 (with V. Müller, J. Nešetřil). Zbl 301.05114

[7] Remark on locally fine spaces. Comment. Math. Univ. Carol. *16* (1975), 501–504. Zbl 316.54028

[8] Atoms in uniformities. Seminar Uniform Spaces 1973–74, directed by Z. Frolík, MÚ ČSAV Praha, 73–81 (with J. Reiterman). Zbl 342.54019

[9] One folklore lemma on cardinal reflections in Unif. Seminar Uniform Spaces 1973–74, directed by Z. Frolík, MÚ ČSAV Praha, 145–147. Zbl 333.54016

[10] Cardinal reflections and point character of uniformities. Seminar Uniform Spaces 1973–74, directed by Z. Frolík, MÚ ČSAV Praha, 149–158. Zbl 326.54020

[11] Reflections not preserving completeness. Seminar Uniform Spaces 1973–74, directed by Z. Frolík, MÚ ČSAV Praha, 235–240. Zbl 327.54024

[12] a) Universal metric spaces, Informal Notes of Seminar of Uniform Spaces, b) Universal metric spaces. Seminar Uniform Spaces 1975–76, directed by Z. Frolík, MÚ ČSAV Praha, 49–53. Zbl 361.54010

[13] a) On uniformly local uniformities. Informal Notes of Seminar Uniform Spaces 1974–75 (with D. Preiss, J. Vilímovský); b) On local uniformities, General Topology Appl. 8 (1978), 67–71 (with D. Preiss, J. Vilímovský). Zbl 397.54022

[14] The number of Hamiltonian circuits. J. Comb. Theory, Ser. B, *24* (1978), 223–227 (with V. Müller). Zbl 378.05036

[15] Atoms and proximal fineness. Seminar Uniform Spaces 1975–76, directed by Z. Frolík, MÚ ČSAV Praha, 37–41 (with J. Reiterman). Zbl 347.54016

[16] Point-character of uniformities and completeness. Seminar Uniform Spaces 1975–76, directed by Z. Frolík, MÚ ČSAV Praha, 55–61. Zbl 346.54009

[17] Two examples of reflections. Seminar Uniform Spaces 1975–76, directed by Z. Frolík, MÚ ČSAV Praha, 63–68 (with J. Vilímovský). Zbl 346.54021

[18] Injectivity of polyhedra. Seminar Uniform Spaces 1975–76, directed by Z. Frolík, MÚ ČSAV Praha, 73 (with P. Pták). Zbl 343.54028

[19] On hedgehog-topologically fine uniform spaces. Seminar Uniform Spaces 1975–76, directed by Z. Frolík, MÚ ČSAV Praha, 75–86 (with Z. Frolík, J. Vilímovský). Zbl 348.54018

[20] On σ-discreteness in uniform spaces. Seminar Uniform Spaces 1975–76, directed by Z. Frolík, MÚ ČSAV Praha, 115–120 (with P. Pták). Zbl 347.54017

[21] General hedgehogs in general topology. Seminar Uniform Spaces 1975–76, directed by Z. Frolík, MÚ ČSAV Praha, 145–150. Zbl 348.54020

[22] Combinatorial properties of uniformities. Lecture Notes in Math. *609* (A. Dold, B. Eckmann, eds.), TOPOSYM IV (1976), 154–165. Zbl 371.54054

[23] Remarks on e-locally fine spaces. Seminar Uniform Spaces 1976–77, directed by Z. Frolík, MÚ ČSAV Praha, 51–62 (with M. D. Rice). Zbl 453.54017

[24] Extension of uniformly continuous functions. Bull. Pol. Acad. Sci. *26* (1978), 143–148 (with Z. Frolík, J. Vilímovský). Zbl 388.54009

[25] Atoms in uniformities and proximities. TOPOSYM IV. JČMF Praha, 1979, pp. 353–356 (with J. Reiterman). Zbl 374.54018

[26] On unions of metrizable subspaces. Canad. J. Math. *32* (1980), 76–85 (with E. van Douwen, D. Lutzer, G. Reed). Zbl 445.54016

[27] The spaces of ultrafilters on N covered by nowhere dense sets. Fundam. Math. *110* (1980), 11–24 (with B. Balcar, P. Simon). Zbl 568.54004

[28] Complements in the lattice of uniformities. Comment. Math. Univ. Carol. *22* (1981), 399–412 (with J. Reiterman). Zbl 491.54020

[29] The complexity of σ-discretely decomposable families in uniform spaces. Comment. Math. Univ. Carol. *22* (1981), 317–326 (with P. Pták). Zbl 488.54014

[30] On compactification of GO-spaces. Topology and order structures (H. R. Bennett, D. J. Lutzer, eds.), Math. Centre Tract 169 (part 2), Amsterdam, 1983, 47–52. Zbl 538.54021

[31] Uniform spaces-selected topics. TOPOSYM v Praze 1981. Sigma Ser. Pure Math., Heldermann, Berlin, 1983, pp. 395–400 (with Z. Frolík, M. Hušek, V. Rödl, J. Vilímovský). Zbl 493.54016

[32] Uniform weight of uniform quotients. Comment. Math. Univ. Carol. *24* (1983), 335–340 (with M. Hušek). Zbl 523.54018

[33] On complexity of metric spaces. Fund. Math. *125* (1985), 133–142 (with A. Hohti). Zbl 589.54035
[34] Extensions of cyclically monotone mappings. Proc. 13th Winter School, Suppl.-Rend. Circ. Mat. Pal., Ser. *II* (1985), 81–88 (with S. Poljak). Zbl 647.90071
[35] Ideals of uniformly continuous mappings on pseudometric spaces. Comment. Math. Univ. Carol. *27* (1986), 571–580 (with J. Vilímovský). Zbl 615.54020
[36] Locally fine uniformities and normal covers. Czechoslovak Math. J. *37* (1987), 181–187. Zbl 656.54020
[37] Continuous images of compact semilattices. Canad. Math. Bull *30* (1987), 109–113 (with M. G. Bell). Zbl 612.54014
[38] Limit behaviour of trajectories involving subgradients of convex functions. Comment. Math. Univ. Carol. *28* (1987), 457–466 (with S. Poljak, D. Turzík). Zbl 623.49009
[39] Extensions and restrictions in products of metric spaces. Topology Appl. *25* (1987), 245–252 (with M. Hušek). Zbl 614.54009
[40] Banach space properties of Ciesielski-Pol's $C(K)$-space. Proc. Amer. Math. Soc. *103* (1988), 1087–1093 (with G. Godefroy, J. H. M. Whitfield, V. Zizler). Zbl 666.46019
[41] The smallest number of free prime closed filters. Fund. Math. *131* (1988), 215–221 (with P. Simon, J. Vaughan). Zbl 669.54001
[42] Analytic spaces and paracompactness of X^2-$\triangle$. Topology Appl. *28* (1988), 11–15 (with G. Gruenhage). Zbl 636.54025
[43] Ultrafilters on ω and atoms in the lattice of uniformities I. Topology Appl. *30* (1988), 1–11 (with J. Reiterman, V. Rödl, P. Simon). Zbl 657.54022
[44] Ultrafilters on ω and atoms in the lattice of uniformities II. Topology Appl. *30* (1988), 107–125 (with J. Reiterman, V. Rödl, P. Simon). Zbl 657.54023
[45] A remark on spaces of bounded continuous functions. Proc. Konin. Neder. Akad. Weter., Ser. A. Indag. Math. *91* (1988), 335–338. Zbl 685.54010
[46] On topological and linear homeomorphisms of certain function spaces. Topology Appl. *32* (1989), 267–277 (with J. Baars, J. de Groot, J. van Mill). Zbl 676.54022
[47] Uniformly continuous selections and ℓ_1-property. Topology Appl. *33* (1989), 85–97. Zbl 709.54016
[48] On supercomplete uniform spaces IV: Countable products. Fund. Math. *136* (1990), 115–120 (with A. Hohti). Zbl 713.54027
[49] On δ-continuous selections of small multifunctions and covering properties. Comment. Math. Univ. Carol. *32* (1991), 121–126 (with A. Fedeli). Zbl 734.54010
[50] On coverings of infinite-dimensional metric spaces. Discrete Math. *108* (1992), 75–81 (with V. Rödl). Zbl 773.54017
[51] Cantor set selectors. Topology Appl. *44* (1992), 163–166 (with V. Gutev, S. Nedev, V. Valov). Zbl 769.54020
[52] On the infimum of the Hausdorff and Vietoris topologies. Proc. Amer. Math. Soc. *118* (1993), 971–978 (with S. Levi, R. Lucchetti). Zbl 845.54006
[53] An example of ℓ_p-equivalent spaces which are not ℓ_p^*-equivalent. Proc. Amer. Math. Soc. *119* (1993), 963–969 (with J. Baars, J. de Groot, J. van Mill). Zbl 787.54018
[54] Function spaces of completely metrizable spaces. Trans. Amer. Math. Soc. *340* (1993), 871–883 (with J. Baars, J. de Groot). Zbl 841.54012
[55] Lindelöf modifications and K-analytic spaces. Mathematika *40* (1993), 1–6 (with P. Holický, D. H. Fremlin). Zbl 780.54036
[56] Infima of hyperspace topologies. Mathematika *42* (1995), 67–86 (with C. Costantini, S. Levi). Zbl 822.54004
[57] a) Embeddings into c_0^+. Rapport nr. 201, Vrije Universiteit Amsterdam (1982); b) Embeddings into c_0. Topology Appl. *57* (1994), 259–269.

[58] The cancellation law for compact Hausdorff spaces and vector-valued Banach-Stone theorems. Arch. Math. *64* (1995), 341–343 (with E. Behrends). Zbl 815.54008

[59] On complete strongly connected digraphs with the least number of 3-graphs. Discrete Math. *155* (1996), 27–30 (with M. Burzio).

[60] Radon spaces which are not σ-fragmented. Acta Univ. Carol., Math. Phys. *36* (1995), 19–25 (with P. Holický). Zbl 853.54025

[61] The impact of closure operators on the structure of a concrete category. Quest. Math. *18* (1995), 381–396 (with D. Dikranjan).

[62] Bases, π-bases and pseudodevelopments. Topol. Proc. *19* (1994), 79–85 (with C. Costantini, A. Fedeli). Zbl 844.54018

[63] Selections that characterize topological completeness. Fund. Math. *149* (1996), 127–140 (with J. van Mill, R. Pol).

[64] A universal complete metric Abelian group of a given weight. Bolyai Math. Studies 4, Proc. of Topology Appl., Szekszárd (1993), 431–439 (with D. Shakhmatov, S. Watson).

[65] Absolute Borel sets and function spaces. Trans. Amer. Math. Soc. *349* (1997), 3585–3596 (with W. Marciszewski).

[66] On supercomplete ω_μ-metric spaces. Bull. Pol. Acad. Sci. *44* (1996), 299–310 (with G. Artico, U. Marconi).

[67] Examples of recurrence. Ann. N. Y. Acad. of Sci. (1996), 316–332 (with S. W. Williams).

[68] Weak covering properties of weak topologies. Proc. London Math. Soc. *75* (1997), 349–368 (with A. Dow, H. Junnila).

[69] Categories of topological spaces with sufficiently many sequentially closed spaces. Cahiers Topologie Geom. Differ. Categ. *38* (1997), 277–300 (with D. Dikranjan).

[70] Normality and paracompactness of the Fell topology. Proc. Amer. Math. Soc. *127* (1999), 2193–2197 (with L. Holá, S. Levi).

[71] Selectors and scattered spaces. Topology Appl. *111* (2001), 35–48 (with G. Artico, U. Marconi, R. Moresco).

[72] Properties related to the first countability of hyperspace topologies. Questions and Answers in General Topology *19* (2001), 139–157 (with G. Di Maio, L. Holá).

[73] Functions with distant fibres and uniform continuity. Topology Appl. *121* (2002), 3–23 (with A. Berarducci, D. Dikranjan).

[74] Compactness and local compactness in hyperspaces. Topology Appl. *123* (2002), 573–608 (with C. Costantini, S. Levi).

[75] Uniform quasi components, thin spaces and compact separation. Topology Appl. *122* (2002), 51–64 (with A. Berarducci, D. Dikranjan).

[76] The locally fine coreflection and normal covers in the products of partition-complete spaces. Topology Appl. *126* (2002), 187–205 (with A. Hohti, M. Hušek).

[77] Selections and suborderability. Fund. Math. *175* (2002), 1–33 (with G. Artico, U. Marconi, L. Rotter, M. Tkachenko).

[78] Developable hyperspaces are metrizable. Applied Gen. Topology *4* (2003), 351–360 (with L. Holá, L. Zsilinsky).

[79] Pseudocompact Whyburn spaces need not be Fréchet. Proc. Amer. Math. Soc. *131* (2003), 3257–3265 (with M. G. Tkachenko, V. V. Tkachuk, R. G. Wilson).

[80] Note on function spaces with the topology of pointwise convergence. Arch. Math. (Basel) *80* (2003), 655–663 (with J. van Mill, Roman Pol).

[81] Weakly Whyburn spaces of continuous functions on ordinals. Topology Appl. *133* (2003), 97–104 (with A. Bella).

[82] Internal descriptions of absolute Borel classes. Topology Appl. *141* (2004), 87–104 (with P. Holický).

[83] The structure of the σ-ideal of σ-porous sets. Comment. Math. Univ. Carol. *45* (2004), 37–72 (with M. Zelený).
[84] Characterizations of Ordinals via Selectors. Topology Atlas, http://at.yorku.ca/i/a/a/b/22.htm (with U. Marconi, L. Rotter).
[85] Extensions of topological spaces. Encyclopedia of General Topology (K. P. Hart, J. Nagata, J. E. Vaghan, eds.). Elsevier, Amsterdam, 2004, pp. 323–325.
[86] On proximities generated by countable families of entourages. Comment. Math. Univ. Carolin. *45* (2004), 535–541 (with S. Ivanov, S. Nedev).
[87] An additivity theorem for uniformly continuous functions. Topology Appl. *146* (2005), 330–352 (with A. Berarducci, D. Dikranjan).

Papers submitted for publication

[88] More on weak covering properties of weak topologies (with A. Dow, H. Junnila).
[89] Zero-selectors and GO-spaces. Topology Appl. *152* (2005), 243–257 (with G. Artico, U. Marconi).
[90] $C(K)$ spaces which cannot be uniformly embedded into $c_0(\Gamma)$ (with P. Holický, O. Kalenda).

Other publications

[i] Zdeněk Frolík, March 10, 1933–May 3, 1989. Czechoslovak Math. J. *40* (1990), 697–708 (with P. Simon). Zbl 733.01025
[iα] Zdeněk Frolík, 10.3.1933–3.5.1989. Čas. Pěst. Mat. *115* (1990), 319–329 (with P. Simon). (In Czech.) Zbl 701.01007
[ii] Zdeněk Frolík 1933–1989. Topology Appl. *44* (1992), 11–17 (with M. Hušek). Zbl 757.01023
[iii] Zdeněk Frolík, his life and work. Topological, algebraical and combinatorial structures (J. Nešetřil, ed.). North-Holland, Amsterdam, 1992 (with B. Balcar, J. Nešetřil, V. Rödl, P. Simon).