Roman Ger, 70 years of a mathematician's adventurous life

MACIEJ SABLIK

That Roman Ger is a prominent mathematician, a scholar of international authority and a giant of organization, is widely known and probably no one has doubts about it. This is certified by his numerous publications (the total number is right now over 120 and still increasing), his co-authored book on iterative functional equations [19], his duty of Chairman of the Scientific Committee of the series of International Symposia on Functional Equations, his leadership of the Katowice group of functional equations and inequalities—these are just a few proofs for Roman's unique commitment to research and scientific life.

I have known Roman Ger for more than 40 years, first I met him at the Institute of Mathematics of the Silesian University when I attended the so called Kuczma's Tuesday Seminar as a student. Roman was then a PhD (he obtained the degree in 1971 for a dissertation supervised by M. Kuczma). Soon after we met for the first time he defended his habilitation dissertation, the first such case at the Silesian University which had existed then for 8 years only. Actually, while Roman spent his whole life in Katowice, and for him there is hardly a life outside the Upper Silesian capital, he obtained the Master's degree at the Jagellonian University of Cracow. However, in Katowice there was a branch of the oldest Polish university, and Roman (together with his future wife Joanna and his colleague Zygfryd Kominek) was among the first, and the last in fact, students of the "Filia", as it was called. Well, on 30th November 1976 he got the degree of "doktor habilitowany" and I was invited to a party to celebrate the event. At that time parties were organized usually at home, so it was my first opportunity to visit Gers' apartment (they married in 1969, and by 1976 they already had two daughters, Kasia and Ewa) at the Millenium Housing in Katowice. Later I often visited there, also for scientific reasons, because Roman started his own seminar (Monday seminar on functional equations and inequalities) in October 1982, and he organized it for more than one academic year in his own flat. That was very romantic despite the fact that the background was not so friendly. That was the dark

period of martial law in Poland, and Roman was a victim of the oppression. The authorities took his passport and he was forbidden to move abroad for some years. Moreover, he had to wait for the title of professor till 1990, when Poland was finally free. The Monday seminar is still very lively (905 sessions up to now). Moreover, for 16 years Roman had been leading two seminars, not only his own, but also the Tuesday seminar (founded by Marek Kuczma, Roman's scientific father), which he eventually transferred to other people. Both seminars in Katowice attracted more than 30 people each, and no wonder that soon Roman was able to educate and promote 15 PhDs, one of them is a full professor today (Kazimierz Nikodem), and four more got their habilitations. In fact, Roman was very much devoted to teaching which has been his passion from his youth. He loves to teach and to give special lectures outside the regular program. He has been invited as popularizer of mathematics to schools and has supported our Pi Days in March for 10 years now. This is why the young people do like very much his scientific supervision.

Roman, though a tough local patriot, likes to travel, and he actually has travelled all his life. He sometimes recalls his first travel abroad, to Italy, for a conference, with a transit visa and a handful of foreign money. He has seen a lot of the world since, and he is always interested in discovering new places. In the academic year 1987/88 Roman went to Orlando, to teach at the University of Central Florida. Recognizing the personality of the guest, the hosts proposed him to stay there, or as we say in Polish, "to choose freedom". However, any temptation was rejected by his wife Joanna, and he was back in Katowice after a year. In the meantime, Ludwig Reich visited our university, and being aware of the opportunities, he said: I hope Roman will not emigrate. Here he is at the proper place, everybody knows Roman Ger from Katowice, here he has his students, colleagues and generally—here is his circle. Ludwig's hope turned to be reality and so we can enjoy the presence of Roman among us. Which, obviously, has not prevented him from travelling, both for professional reasons and for leisure. I remember that one year we traveled with Roman's family, to Eastern Poland. From there it was very close to Lvov, nowadays in the Ukraine, but formerly in Poland. In Lvov the famous Polish School of mathematics was founded, and the celebrated "Scottish Book" was written, which contained many serious problems. Roman always had respect for all the members of Lvov School of mathematics: Banach, Ulam, Orlicz, Mazur, Steinhaus and others (one of his papers refers to Mazur's criterion problem from the "Scottish Book" [12]). I remember our disappointment when we learnt that the former Scottish Café is now a bank (at least it still has something to do with mathematics, but this time a financial one).

To Lvov we went by bus, which was rather unusual in the case of Roman Ger. I have to confess and maybe reveal a secret of Polichinelle, an open secret, that Roman is a devoted driver. And he likes to drive rather fast. Actually, it seems to me that his driving is similar to his mathematics: he always pushes

forward, regardless of speed controls and policemen, but he safely reaches the goal.

From the point of view of mathematics which has been his greatest love (I hope that Joanna will pardon these words) Roman has been always dealing with functional equations and inequalities, although his interests are much larger. He began with studying properties of convex functions but soon he got interested in questions concerning the conditional equations and inequalities, considered equations on restricted domains, almost everywhere in the sense of some ideal of sets. One day he coauthored a paper (cf. [1]) in which it gradually turned out that no regularity (even a weak one) was needed, and somebody joked “So maybe the equation itself is not needed?”. Actually, it was “almost” so because they assumed the equation to hold almost everywhere, in the sense of the Lebesgue measure. In fact, one of Roman’s essential features is looking for solutions in large classes of functions, he loves to see the strength of the object (equation or inequality) that forces solutions to be highly regular.

Roman “reactivated” the area of Ulam–Hyers stability, his and his colleagues’ papers gave a new life to the topic that was in a “sleep mode”. He introduced a notion later called “Ger’s additivity” by Félix Cabello Sánchez in [4]. One of the most important papers was written jointly by Roman and Peter Šemrl (cf. [18]), where they deal with the phenomenon of superstability of the exponential equation. Later the notion of Ger stability appeared and has been used by several researchers.

In 1985 the paper [6] was published. Dealing with some apparently strange equations stemming from the theory of jets, he discovered how essential the solution would be of the functional congruence $f(x+y) - f(x) - f(y) \in \mathbb{Z}$. That was a starting point for the development of the study of functional congruences for different equations, groups and settings. Again, many of us tried their best and followed the pattern or solved the problems intuitively proposed by Roman.

He also proved a characterization of strictly convex spaces in terms of solving the Fischer–Muszély equation $\|f(x+y)\| = \|f(x) + f(y)\|$ (cf. eg. [11]). That was very interesting and inspiring for many people. It is the same with the question of alienated functional equations, started by J. Dhombres and successfully continued by Roman and Ludwig Reich, just to name the very first to deal with the problem.

Roman is also a cherished coauthor of papers stemming from probability, he coauthored at least two such papers (cf. [14, 17]). He never forgot about the source of Polish functional equations that were brought by Roman’s scientific Grandfather Stanisław Gołąb, that is geometry. Roman has several papers devoted to geometry, let us quote just a few: [2, 5, 7, 9], or [10]. He is also very active in submitting papers concerning the applications of functional equations or inequalities to functional analysis or harmonic analysis (let us mention e.g. [3, 8, 11, 13, 15], or [16], just to cite a few).

There are some results that have never been published, although they are known to the community of *functional equationists*, for instance at the 19th ISFE in 1981 which was held in Nantes and La Turballe (France) Roman presented a talk on *A conditional Cauchy equation stemming from ideal gas theory*, where orthogonal additivity appeared, again inspiring a lot of results by Roman's colleagues. It is worth mentioning that at that meeting Roman played soccer in the team "Rest of the World" against a very strong German team. Unfortunately, he broke his arm during the game. Ever since the organizers kindly ask the participants to be insured, this may be called Roman's contribution to the development of insurance mathematics.

Let me conclude this article by underlining that we all love Roman for his mathematical behavior but this is far from being the only reason for the respect of our Dear Colleague. He has been displaying during his life a sense of independence and self-reliance which we observed so often. For example he opposed the military regime and opposes any dictatorship, he resigned from the post of vice-rector when being forced to act against his own beliefs, he never hesitates to put his authority at stake in cases he is committed to, and I could continue enumerating but let me stop here. All of us, his friends, students and collaborators wish him good health, clear brain, love of his family, permanent production of some new results, enjoying life and being a friend to all of us. Ad multos annos, Dear Roman!

Open Access. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

References

- [1] Aczél, J., Járαι, A., Ger, R.: Solution of a functional equation arising from utility that is both separable and additive. *Proc. Am. Math. Soc.* **127**, 2923–2929 (1998)
- [2] Alsina, C., Garcia-Roig, J., Ger, R.: How to keep the quadrilateral inscribed. *Abh. Math. Semin. Univ. Hambg.* **65**, 123–133 (1995)
- [3] Badora, R., Ger, R., Páles, Zs.: Additive selections and the stability of the Cauchy functional equation. *Aust. N. Z. Ind. Appl. Math. J.* **44**(3), 1–15 (2002)
- [4] Cabello Sánchez, F.: Stability of additive mappings on large subsets. *Proc. Am. Math. Soc.* **128**(4), 1071–1077 (2000)
- [5] Ger, J., Ger, R.: On some aspects of Jensen–Menger convexity. *Stochastica (Barcelona)* **13**, 43–60 (1992)
- [6] Ger, R.: On a functional equation related to the theory of jets. *Rocz. Naukowo-Dydakt. WSP Rzesz. Mate.* **7**(62), 15–25 (1985)
- [7] Ger, R.: A consistency equation for three geometries. *Aequ. Math.* **29**, 50–55 (1985)
- [8] Ger, R.: Convex transformations with Banach lattice range. *Stochastica (Barcelona)* **11**, 17–23 (1987)
- [9] Ger, R.: On a functional equation related to the problem of characterizing the cross-ratio. *Rad. Mate.* **8**, 177–188 (1992)
- [10] Ger, R.: On a system of functional equations occurring in projective geometry. *Rad. Mate.* **8**, 189–200 (1992)
- [11] Ger, R.: On a characterization of strictly convex spaces. *Atti Accad. Sci. Torino* **127**, 131–138 (1993)
- [12] Ger, R.: Mazur's criterion for continuity of convex functionals. *Bull. Pol. Acad. Sci. Math.* **43**, 263–268 (1995)
- [13] Ger, R., Gilányi, A., Volkman, P.: Completeness of normed spaces as a consequence of the stability of some functional equations. The Ninth Katowice–Debrecen Winter Seminar, Report of Meeting. *Ann. Math. Silesianae* **23**, 112–113 (2009)
- [14] Ger, R., Keane, M., Misiewicz, J.: On sums of independent pseudo-isotropic random vectors. *J. Theor. Probab.* **13**(4), 977–995 (2000)
- [15] Ger, R., Kochanek, T.: An inconsistency equation involving means. *Colloq. Math.* **115**, 87–99 (2009)
- [16] Ger, R., Kominek, Z.: Boundedness and continuity of additive and convex functionals. *Aequ. Math.* **37**, 252–258 (1989)
- [17] Ger, R., Misiewicz, J., Wołowski, J.: The Lukacs theorem and the Olkin–Baker equation. *J. Math. Anal. Appl.* **399**(2), 599–607 (2013)
- [18] Ger, R., Šemrl, P.: The stability of the exponential equation. *Proc. Am. Math. Soc.* **124**, 779–787 (1996)
- [19] Kuczma, M., Choczewski, B., Ger, R.: Iterative functional equations. Cambridge University Press, Cambridge (1990) (published in “Encyclopedia of Mathematics and Its Applications”, 2nd edn, 2008)

Maciej Sablik
Institute of Mathematics
Silesian University
Bankowa 14
40-007 Katowice, Poland
e-mail: maciej.sablik@us.edu.pl

Received: January 13, 2016