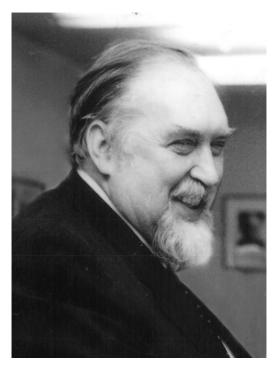
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REMINISCENCES ABOUT PROFESSOR ANDRZEJ GRANAS

LECH GÓRNIEWICZ

 $Dedicated\ to\ the\ memory\ of\ my\ teacher$



Professor Andrzej Granas (April 5, 1929 – March 5, 2019)

The death of Professor Andrzej Granas on March 5, 2019 in Warsaw brought sorrow and regret to a wide group of mathematicians and his former students. Professor Andrzej Granas was born on April 5, 1929 in Łódź. In 1947, he completed secondary education in the Liceum Ogólnokształcące im. Tadeusza Kościuszki w Łodzi (High School of Tadeusz Kościuszko in Łódź). In 1952, he graduated from mathematical studies at the University of Warsaw, his area of expertise, under the supervision of professor Karol Borsuk, was topology. Between 1952 and 1955, he completed his studies at the Lomonosov Moscow State University and in 1958, on the basis of his dissertation I.1 written under the direction of professor L. Lusternik, he received his Ph.D. (candidate) in mathematical sciences. In 1962, on the basis of the dissertation I.2, he got a degree of a habilitated doctor and in 1965 Andrzej Granas achieved the scientific title of full professor.

Professor Andrzej Granas had positions at both Polish and foreign universities, namely at:

- Instytut Matematyczny PAN w Warszawie (Institute of Mathematics of the Polish Academy of Sciences in Warsaw),
- Uniwersytet Mikołaja Kopernika w Toruniu (Nicolaus Copernicus University in Torun),
- Wyższa Szkoła Pedagogiczna w Gdańsku (Higher Pedagogical School in Gdańsk),
- Uniwersytet Warmińsko-Mazurski w Olsztynie (University of Warmia and Mazury in Olsztyn),
- Chicago State University,
- Collège de France,
- Université de Montréal (The University of Montreal).

He was a visiting professor invited by well-known centres in the USA, England, Germany, France, Russia, China, Japan, and Australia. While working in Gdańsk, he founded the Gdańsk section of the Polish Academy of Sciences, and in Toruń – the Juliusz P. Schauder Center for Nonlinear Studies as well as the journal Topological Methods in Nonlinear Analysis; in Montreal – the Journal of Fixed Point Theory and Applications. Both journals boast world-wide prestige and they are indexed in the ISI Master Journal List.

The lectures delivered by professor Granas were marked by very high quality, both scientifically and educationally speaking. In Poland, Professor Granas pioneered algebraic topology, fixed point theory and nonlinear analysis. The scientific seminars organized by Professor Andrzej Granas concerned the issues being subject to the then main-stream global scientific investigation; moreover, the said seminars were highly esteemed by the Ph.D. students. Professor Andrzej Granas supervised Ph.D. theses of the following candidates (in the alphabetical order): H. Ben-El-Mechaiekh, C. Bowszyc, J.N. Corvellec, P. Deguire, N. EL-Khaattabi, G. Fournier, M. Frigon, G. Gauthier, K. Gęba, L. Górniewicz, Z. Guennoun, C. Horvath, T. Kaczyński, W. Krawcewicz, and M. Lassonde. The development of Polish and Canadian mathematics was of special interest to Professor Granas. For this reason, he organized summer schools as well as conferences. Due to a high scientific status of Professor Andrzej Granas, the main lectures during the above-mentioned events were delivered by world specialists in their respective fields. It is worth noting that for all the schools and conferences organized in Montreal, Professor Granas invited a large number of Polish mathematicians. The above-mentioned activities of the Professor considerably contributed to development of topology and of nonlinear analysis in Poland, in particular in the centers of Toruń and Gdańsk.

Professor Andrzej Granas was a world-famous Polish mathematician. He dealt with topology, fixed points theory, nonlinear and convex analysis, as well as differential equations (see: the list of publications below). In all of the abovelisted fields, he obtained some major results, well recognized in the world literature on the subjects. Among others, these include what follows: infinitedimensional cohomologies, the Borsuk–Ulam theorem, the Lefschetz fixed-point theorem for single- and multi-valued mappings, the topological degree; he introduced the concept of topological essentiality and continuation method, specified important applications of topological methods to differential equations, nonlinear analysis, minimax problems and to mathematical economics (see the list of publications below). The publication that earned him a world-wide recognition is the monograph I.5 (I.9), which has been hitherto cited 1000 times. The scientific accomplishments of Professor Granas have granted an unshakable and well-deserved reputation in the world literature.

What played a significant role in the Professor's life was classical music, in which he took a great interest in, simultaneously being a great pianist himself. Apart from mathematics and music, a major interest cherished by Andrzej Granas was playing chess. Finally, he also regarded tennis and playing bridge as a worthy sort of entertainment.

Professor Andrzej Granas was a scholar with broad interests, a great teacher who was very kind to his students. He made a very significant contribution to the world of mathematics. He deservedly earned his good reputation in both Polish and Canadian mathematics. The memory of him shall always be cherished by innumerable students and by a large number of mathematicians.

Professor Andrzej Granas loved Poland and confirmed it with his words and initiatives all his live.

Publications

I. Monographs, lecture notes and surveys

- 1. Zastosowania twierdzenia o antypodach w topologii przestrzeni Banacha (The application of Borsuk–Ulam theorem in the topology of Banach's spaces), a doctoral dissertation, Uniwersytet Łomonosowa w Moskwie, 1958 (in Russian).
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- 3. Topics in Fixed Point Theory, Sem. J. Leray, 1969/1970.
- 4. Points fixes pour les applications compactnes: espaces de Lefschetz et la théorie de l'indice, Press Univ. Montreal, 1980.
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II. Articles

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- Quelques théorèmes concernant la stabilité des solutions de certaines équations non linéaires, C.R. Acad. Sci. Paris Sér. 260 (1965).
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- Fixed point theorem for approximative ANR-s, Bull. Acad. Polon. Sci. 16 (1968).
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