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Seventieth birthday of Professor Otakar Borůvka

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the Charles University where he became Docent in 1931 and where he has been active as Professor since 1935. For more than thirty years passed from his appointment, a great number of young people interested in mathematics have attended his lectures and seminars and many of them have been enraptured by algebra in the same way as their teacher. A particularly important part in this respect has been played by Kořínek's algebraic seminar "for advanced students" attended by people (mostly graduates) interested in algebra from all Prague and which has a long years' tradition. Here the latest results published in journals are reported on, interesting problems are formulated, solutions for them are sought and new original papers originate. Professor Kořínek has many disciples; some of them continue the work of their teacher and have achieved remarkable results in algebra. Moreover, there is a number of those who work in other fields of mathematics but who are indebted to Professor Kořínek for having made themselves acquainted with the method of scientific work in his seminars and for having written their first papers; they all keep considering themselves as his disciples. When speaking about the pedagogical activity of Professor Kořínek we must not omit his text-book of algebra which had a great merit to become a basis for algebraic education of mathematics students at the University.

In addition to Professor Kořínek's successful scientific and teaching activity we must remember the work he has done in numerous academic and non-academic functions, notably his activity in learned societies such as the Royal Czech Society of Sciences, the Czech Academy of Sciences and Arts, the Czechoslovak National Research Council and finally the Czechoslovak Academy of Sciences the member of which he has been since its foundation in 1952. For decades, Professor Kořínek has served as officer in the Association of the Czechoslovak Mathematicians and Physicists. He was its first vice-chairman at the time when the centenary of its foundation was celebrated. For his meritory work he was awarded the Order of Labour on that occasion. In the period 1953 – 55 he headed the Faculty of Mathematics and Physics as its Dean. In all functions Professor Kořínek has held he has enjoyed a great authority thanks to his moral qualities, to his energy and steadiness and to his personal courage.

On behalf of the Czech mathematical community we wish Professor Kořínek to live many years in good health and to attain many further achievements in his work he loves so much.

SEVENTIETH BIRTHDAY OF PROFESSOR OTAKAR BORŮVKA

MILOŠ RÁB, Brno

On May 10, 1969, OTAKAR BORŮVKA, member of the Czechoslovak Academy of Sciences, professor of mathematics at the Science Faculty of the J. E. Purkyně University, will be seventy.

His fifty years' activity at our universities has, to a large extent influenced, the development of mathematics in Czechoslovakia, especially in Moravia and Slovakia. His outstanding capacities and his incredible working enthusiasm have gained a number of younger mathematicians for scientific career by inspiring them to an independent creative activity in a very large range of problems. He has written about 70 papers on different mathematical subjects, especially in the field of differential geometry, modern algebra as well as of differential equations and has contributed to each of these branches results of world standard. His scientific comprehensiveness proved to be of advantage for his work as it enabled him to gain not only a very original approach to the solution of problems but also a deep and detailed treatment discovering the essence of the matter. In this short article we will only recall the most significant features of the work and personality of Professor Borůvka, particularly in the last ten years, as his work and activity till 1959 has been dealt with in detail in the article "*K šedesátinám Otakara Borůvky*" (The sixtieth birthday of Otakar Borůvka) by M. NOVOTNÝ, K. SVOBODA and M. ZLÁMAL, published in *Časopis pro pěstování matematiky*, 84 (1959), 236–250.

The period of these last ten years has been filled up with intensive work in the theory of linear differential equations. The number of the members of his seminar, founded in 1946, has increased to 50 workers coming from nearly all universities in Moravia and Slovakia. It was in this seminar that Professor Borůvka first presented his theory of dispersions which has become the basis for a very vast and fruitful theory of linear differential transformations of the second order. He summarized his fifteen years' effort in this field in the book [61]. This book, unique of its type, consists of two parts: The first part is devoted to the theory of dispersions, which are functions describing in, a certain sense, the location of the zeros of the solution and its derivative for the equation

$$(1) \quad y'' = q(x) y,$$

the second part deals with the general theory of transformations of this equation. Both ranges of problems, which are closely related, date back with their roots to the period of Sturm and Kummer. To treat them with success it was first necessary to grasp the essence of the matter, to broaden and to deepen numerous classical concepts, to introduce many new ones and to discover by their means new, often surprising relations between the location of the zeros of the solution of two equations of type (1) and the transformations from one to another. The result is a qualitative theory of global character; admitting by a high degree of geometrization and algebraization, very rich in contents and in methods and yielding extensive applications; e.g., the structure of all equations of the second order the solutions of which possess properties given in advance can be analysed. Numerous Czechoslovak and foreign authors exploit the results of this theory to solve different problems concerned not only with equations of the second order but also of the higher ones; moreover, it is often exploited in differential geometry. Borůvka's theory has also made it possible to evaluate,



Professor OTAKAR BORŮVKA

from a uniting point of view, a wide range of problems concerning oscillatory and asymptotic properties of differential equations of the second order.

In 1960 Borůvka's quite original book in the field of algebra [47], which is a substantial enlargement of his book "*Úvod do teorie grup*" (Introduction into the theory of groups), appeared. It is worth mentioning that in the international German mathematical dictionary of 1961, this book is cited among 23 basic works of world literature on groups and among 3 basic works on groupoids.

The significance of the achievements attained by Professor Borůvka is testified by the wide response they met with abroad and by a number of decorations and honours awarded not only in this but also in foreign countries: In 1957 Euler's medal of the German Academy in Berlin, in 1959 State prize of Kl. Gottwald, in 1960 Euler's medal of the Academy of Sciences of the U.S.S.R., in 1961 membership in the honorary Committee for organizing the celebrations of Archimedes in Syracuse, in 1962 honorary membership in the Association of Czechoslovak Mathematicians and Physicists, in 1963 Regional Prize in the field of Science (awarded for the work "*Základy teorie grupoidů a grup*" (Foundations of the theory of groupoids and groups)), in 1964 medal of Jagelon University in Cracow, in 1965 Order of Labour, in 1968 a golden medal of Palacký University in Olomouc and a number of others. On the occasion of the 25th anniversary of the foundation of the Faculty of Natural Science of Comenius University in Bratislava, Professor Borůvka was awarded a golden medal for his outstanding and selfless assistance in building it up. The help he was giving to the Bratislava University for more than ten years outside his duties in Brno is highly appreciated by the Slovak mathematicians as a substantial contribution to the development of mathematics in Slovakia and also from the political point of view. This activity gave rise to a very narrow collaboration between the Slovak mathematicians and those from Brno. The enumeration of honours should be completed by a number of personal invitations to Universities in different European countries to give lectures on the results obtained: Brussels, Liege (1948); Warsaw, Cracow, Wrocław (1953); Bucharest, Iasi (1956, 1963); Paris (1961, 1968); Greifswald, Halle, Rostock (1962); Stuttgart, Tübingen, Giessen (1964); Rome (1967); London, Cambridge, Coventry (1968). In addition, he took an active part in many international conferences and congresses (U.S.S.R., Italy, Roumania, Hungary, Poland, German Democratic Republic).

Great love of work and an unbounded helpfulness mark all the activity of Professor Borůvka and reflect especially in his teaching activity where he has gained extraordinary merits. He is an outstanding pedagogue, known by his well prepared lectures and winning his auditors by his tireless diligence. His sterling character, his disinterestedness and optimism make him a favourite personality both among students and his collaborators who always find understanding and ready help from him.

In addition to his scientific and teaching activity Prof. Borůvka holds a number of functions. He is member of the Board of Mathematics of the Czechoslovak Academy of Sciences, member of the Board for Mathematics and Physics in the State Com-

mittee for Universities, member of the Board for Science in the Committee for State prizes of K. I. Gottwald, member of the Central Committee of the Association of Czechoslovak Mathematicians and Physicists and member of the Scientific Council of the J. E. Purkyně University.

Finally it is important to mention the merit of Professor Borůvka as the founder of a new mathematical journal "*Archivum Mathematicum*" the Brno University started issuing in 1965. Professor Borůvka has become editor of this journal which, under his direction, has become well-known abroad. Its exchange for foreign journals brings a good acquisition for the library of the chairs of mathematics every year.

Though incomplete, this brief review of the activity of Professor Borůvka shows how much work was necessary to attain such outstanding achievements. And it is perhaps due to this fact that he celebrates his seventieth birthday in full strength and enthusiasm for his work with a rich programme for the future. On behalf of all Czechoslovak mathematicians we wish him favourable conditions and much health and vigour for the fulfilment of his plans in the coming years.

COMPLEMENT TO THE LIST OF PAPERS OF PROFESSOR OTAKAR BORŮVKA

A. Scientific papers

- [47] Grundlagen der Gruppoid- und Gruppentheorie. VEB Deutscher Verlag der Wissenschaften Berlin, 1960, XII + 198 S.
- [48] Sur les transformations différentielles linéaires complètes du second ordre. Ann. Mat. Pura Appl. XLIX, 1960, 229—251.
- [49] Transformations des équations différentielles linéaires du deuxième ordre. Paris. Séminaire Dubreil-Pisot, 3 mai 1961 (Algèbre et Théorie des nombres 14^e année, 1960/61, n^o 22; 1—18).
- [50] Décompositions dans les ensembles et théorie des groupoides. Paris, Séminaire Dubreil-Pisot, 8 mai 1961 (Algèbre et Théorie des nombres 14^e année, 1960/61, n^o 22 bis; 19—35).
- [51] Sur la structure de l'ensemble des transformations différentielles linéaires complètes du second ordre. Ann. Mat. Pura Appl., LVIII, 1962, 317—333.
- [52] Základy teorie grupoidů a grup (Foundations of the theory of groupoids and groups), Nakladatelství ČSAV, Praha, 1962, 1—216.
- [53] Über einige Ergebnisse aus der Theorie der linearen Differentialtransformationen 2. Ordnung. Heft 13 der Schriftenreihe der Institute für Mathematik. Bericht von der Dirichlet-Tagung-Akademie-Verlag. Berlin 1963, 51—57.
- [54] Sur l'ensemble des équations différentielles linéaires ordinaires du deuxième ordre qui ont la même dispersion fondamentale. Bull. Inst. Politehn. Iasi, Serie noua, IX (XIII) 1963, 11—20.
- [55] Transformation of Ordinary Second-Order Linear Differential Equations. Differential Equations and their Applications. Proceedings of the Conference hold in Prague in September 1962, Prague 1964, 27—38.
- [56] Über die algebraische Struktur der Phasenmenge der linearen oszillatorischen Differentialgleichungen 2. Ordnung. Bericht von der Tagung über geordnete Mengen, Brno, November 1963. Publ. Fac. Sci. Univ. J. E. P. Brno, n^o 457, 1964, 461—462.

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- [58] Über die allgemeinen Dispersionen der linearen Differentialgleichungen 2. Ordnung. An. Sti. Univ. „Al. I. Cuza“ Iasi XI_B, 1965, 217—238.
- [59] Sur une application géométrique des dispersions centrales des équations différentielles linéaires du deuxième ordre. Ann. Mat. Pura Appl., *LXXI*, 1966, 165—188.
- [60] Neuere Ergebnisse in der Transformationentheorie der gewöhnlichen linearen Differentialgleichungen 2. Ordnung. Vorträge der 3. Tagung über Probleme und Methoden der mathematischen Physik, Heft 1, 13—27. Technische Hochschule Karl-Marx-Stadt, 1966.
- [61] Lineare Differentialtransformationen 2. Ordnung. VEB Deutscher Verlag der Wissenschaften Berlin, 1967, XIV+ 218 S.
- [62] L'état actuel de la théorie des transformations des équations différentielles linéaires du deuxième ordre. Colloque sur la théorie de l'approximation des fonctions. Cluj, 15—20 Septembre, 1967.
- [63] Théorie des transformations des équations différentielles linéaires du deuxième ordre. Rend. Mat., *26*, 1967, 187—246.
- [64] Eléments géométriques dans la théorie des transformations des équations différentielles linéaires et ordinaires du deuxième ordre, in the press (Bologna).

B. Other publications

- [34] O životě a díle českého matematika Matyáše Lercha (Life and work of the Czech mathematician Mathias Lerch), Mat. fyz. Rozhl., *38*, 1959—60, 271—272.
- [35] Oslava 100. výročí narozenin českého matematika Matyáše Lercha (Celebration of the centenary of birth of the Czech mathematician Mathias Lerch), Spisy Přír. Fak. Univ. J. E. P., *425*, 1961, 347—372.
- [36] Diferenciálne rovnice. (Vysokoškolské učební texty) [Differential Equations. (Teaching materials for University students)], Slovenské pedagog. nakl. Bratislava, 1961, 1—205.
- [37] Brněnské období působení akademika Eduarda Čecha (Brno period in the activity of Professor Edward Čech), Čas. Pěst. Mat., *86*, 1961, 498—499.
- [38] Oslavy výročí založení Humboldtovy university a Charité v Berlíně (Celebration of the anniversary of foundation of Humboldt University and of Charité in Berlin), Čas. Pěst. Mat., *86*, 1961, 381—382.
- [39] Aktuální otázky matematiky (Problems of actual interest in mathematics), Folia Přír. Fak. Univ. J. E. P. v Brně, vol. *III*, paper 2, 1962, 3—7.
- [40] Jubilejní vzpomínka na Jednotu československých matematiků a fyziků v Brně (A reminiscence of the Association of Czechoslovak Mathematicians and Physicists in Brno written on the occasion of its jubilee), Pokroky Mat. Fyz. Astron. *VIII*, 1963, 305—306.
- [41] Rozvoj matematiky v ČSSR v posledních 20 letech (Development of mathematics in Czechoslovakia in the last 20 years), Pokroky Mat. Fyz. Astron., *X*, 1965, 247—254.

THE SIXTIETH ANNIVERSARY OF RNDr. LADISLAV ŠPAČEK

On May 30, 1969, RNDr. LADISLAV ŠPAČEK, head of the department of vibration and streaming and vice-head of the department of applied mathematics in the State Research Institute for Machine Design in Prague, will be sixty.

After studies at the Faculty of Science of the Charles University in Prague, at the Sorbonne and in Cambridge he worked for a short time in the Institute of Mathematics of the Charles University.