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SEVENTIETH BIRTHDAY OF PROFESSOR VOJTĚCH JARNÍK

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VOJTĚCH JARNÍK, member of the Czechoslovak Academy of Sciences, professor at the Faculty of Mathematics and Physics of the Charles University, will observe his seventieth birthday on December 22, 1967. For the Czechoslovak mathematicians this is an opportunity to recall with admiration the extent and importance of his scientific work and to realize once again how deeply his pedagogical activity and organizing work lasting nearly fifty years have marked the Czechoslovak mathematical life.

The present article written for this special occasion will only deal with the most significant features of Professor Jarník's work and personality – a more detailed exposition of his work and activity till 1957 may be found in the article entitled "*Akademik Jarník šedesátníkem*" (Sixtieth birthday of Professor Jarník), by VL. KNICHAL and Š. SCHWARZ, Čas. pěst. mat. *82* (1957) 4, 463–492.

Professor Jarník has made his name as scientist by his papers on the theory of numbers, or more specifically, on the theory of lattice points, geometry of numbers and diophantine approximations. The results obtained by Jarník are contained, as basic results in the mentioned fields, in monographs. The first papers by Jarník on the theory of lattice points appeared in 1924 and the results of his paper published in 1925 (given under No. 9 in the list of papers at the end of the above article by Vl. Knichal and Š. Schwarz) got along with their proofs in the monograph "*Vorlesungen über Zahlentheorie*" by E. LANDAU in 1927; Landau directs attention to the importance of this paper in his introduction to an extensive chapter on lattice points. The significance of this paper has also been emphasised by JU. V. LINNIK who puts it into relation with some results of I. M. VINOGRADOV, in his comment on the paper by V. G. VORONYI, "*Об одной задаче из теории асимптотических функций*" in the second volume of Voronyi's collected works.

An extremely high appreciation of the results obtained by V. Jarník was given in the lecture of A. WALFISZ presented at the First Congress of Slavonic Mathematicians in Warsaw in 1929; an extended version of this lecture appeared in Časopis pro pěstování matematiky a fysiky *59* (1929), 200–223 under the title „*O některých novějších výsledcích z teorie mřížových bodů*" (On some more recent results in the

theory of lattice points). Walfisz introduces Jarník's results as follows: "Although the estimates (33) and (34) have permitted a certain look inside the theory of lattice points, it was clear from the beginning that the ideas leading to these estimates were merely a means of orientation, for lack of a better one. It was thus necessary to throw the singular series overboard and to find something quite different. I thought that it would take some time. The more surprising – and not only to me – have been the discoveries of Jarník. In a number of treatises, the publication of which dates back to the middle of the last year (i.e. 1928) and which by their originality, depth of ideas and technical accomplishment range among the most admirable papers of modern investigation, Jarník has attacked the problem with very efficient auxiliary means and has obtained a number of results of an astonishing exactness." And then he analyses in detail Jarník's original methods and results. The papers by Jarník on the theory of lattice points got to a large extent into Walfisz's monograph, "*Gitterpunkte in mehrdimensionalen Kugeln*" in 1957; the papers on the geometry of numbers and the theory of diophantine approximations have been exposed and analysed in detail in KOKSMA's monograph "*Diophantische Approximationen*" and have found their way into the thin monograph of CASSELS, "*Introduction to Diophantine Approximations*" of 1957, where only few, most significant papers are referred to.

In the theory of numbers the formulation of results is usually very simple but the proofs are often complicated and an extensive apparatus of mathematical analysis is used; this situation appears as a rule in the theory of lattice points where a many-sided mathematical erudition is the primary condition of success. A convincing though incomplete testimony of the breadth of Jarník's scientific interests is the list of his papers. The part A of the list contains besides the papers on the theory of numbers a great number of papers on the theory of real functions and also papers on the graph theory, series theory, set theory and on other different topics in the field of mathematical analysis. Among 35 review and critical studies in the part D, we find in addition to a number of articles reviewing monographs on the theory of numbers, the reviews of monographs on entire and meromorphic functions, functional analysis, theory of dimension, almost periodic functions, trigonometric series, orthogonal series, Zeta-functions, Dirichlet series, theory of integral, the books on foundations of mathematical analysis and the studies on Bernard Bolzano. The reviews of Professor Jarník are mostly little studies providing information not only on the contents but also on the methods developed in the publication.

And those who are in everyday contact with Professor Jarník know very well of his erudition in a number of mathematical disciplines not included in the above enumeration – as an example let us mention his lectures on probability methods in the theory of numbers and on ordinary differential equations in real and complex domain.

Professor Jarník has been active at the Charles University for 46 years, since 1928 as Extraordinarius and since 1935 as Ordinarius – (his teaching activity is in fact two years longer – from 1919 to 1921 he was a lecturer at the Technical University in Brno) and is one of those who are particularly fitted for teaching profession. His

lectures are always prepared in all details and, thanks to his thoroughly thought out method, even a difficult problem is apt to become an easy one.

However, the most valuable is that Professor Jarník transmits his enthusiasm for mathematics to his students. His pedagogical activity has marked several generations of mathematics students at the Charles University and a large number of the Czechoslovak contemporary mathematicians may be considered his students.

Without devotion to lecturing and to the profession of a University teacher he could hardly have written his four volumes concerned with mathematical analysis, i.e. Differential calculus I and Integral calculus I, textbooks of introductory nature, and Differential calculus II along with Integral calculus II, extensive textbooks, nearly monographs.

The development of the Czechoslovak mathematics has been influenced by more than fifty years of Professor Jarník's activity in the Association of Czechoslovak Mathematicians and Physicists. For more than twenty years he was a member of its Committee and for fifteen years he was editor in chief of the mathematical part of Časopis pro pěstování matematiky a fysiky; in this function he read and handled devotedly tens of manuscripts, gave in this way assistance to young beginning authors and cotributed greatly to the fact that Časopis as well as later the Czechoslovak Mathematical Journal became a recognized international mathematical forum. For his outstanding achievements in the field of science and for his merits in the development of the Czechoslovak mathematics Professor Jarník was awarded the State prize in 1952.

Throughout the past decade Professor Jarník was one of the leading personalities in the Czechoslovak mathematical life. A survey of his publication activity is given in the supplement to the list of his papers at the end of the present article. In the paper [86] Professor Jarník proves that the inequality resulting from the principle of transfer and proved by DELONE, KHINTCHINE and MAHLER ist sharp, in the paper [87] he constructs matrices $\Theta = (\Theta_{ij})$ with algebraically independent Θ_{ij} so that the function $\overline{\Psi}_\Theta(t) = \min\limits_{0<|x|\leqq t} \max\limits_{i=1,\ldots,l} \left|\sum\limits_{j=1}^{m} \Theta_{ij}x_j + x_{m+i}\right|$, $|x| = \max\limits_{j=1,\ldots,m+i} |x_j|$, x_j being integers tends to zero as fast as possible (the cases $m = 1$ and $m > 1$ differ here considerably). Let S be the set of such $(\alpha_1 \ldots \alpha_\tau)$ that the estimate $P(x) = O(x^{r/2-\lambda+\varepsilon})$ holds for every $\varepsilon > 0$. Here, $P(x) = V(x) - A(x)$ and $A(x)$ is the number of lattice points satisfying the inequality $Q(u) \leqq x$, where

$$Q(u) = \alpha_1(u_{1,1}^2 + \ldots + u_{1,r_1}^2) + \ldots + \alpha_\tau(u_{\tau,1}^2 + \ldots + u_{\tau,r_\tau})^2 ,$$

$$r = \sum_{i=1}^{\tau} r_i > 4 , \quad \lambda = \sum_{j=1}^{\tau} \min\left(1, \tfrac{1}{4}r_j\right)$$

and $V(x)$ is the volume of the ellipsoid determined by the inequality $Q(y) \leqq x$. In [88] there are proved some special properties of S (from which it follows that S contains almost all $(\alpha_1, \ldots, \alpha_\tau) \in E_\tau$).

PROFESSOR VOJTĚCH JARNÍK

In the past decade, Professor Jarník did an important amount of work in mathematics teaching and in organization of science. Three times he has been Vice-Dean at the Faculty of Mathematics and Physics of the Charles University and during the school year 1959–60 he was Dean. He has been leading the chair of basic mathematical disciplines since its foundation in 1962. In the Czechoslovak Academy of Sciences he was vice-chairman of the Scientific Board of Mathematics from 1962 until 1964 and its chairman in the period 1964 to 1966. Since 1958 when the periodical Acta Arithmetica devoted to the theory of numbers was reappearing in Poland he has been anew a member of its editorial board.

All his activity bears the mark of his personality. In this respect, in addition to his profound scientific and human erudition, besides his ability to grasp and to formulate the essence of the problem, his tact, personal modesty and last but not least his sense of humour should be mentioned. He is always inconspicuous, always ready to listen to anybody without showing him his scientific superiority; he never gets overwhelmed by a one-sided argumentation and always weights thoroughly all points of view. And as for his sense of humour we can only regret that the mathematical publications do not give any opportunity to benefit from this quality.

Professor Jarník celebrates his seventieth birthday with important scientific and working plans. On behalf of the Czechoslovak mathematicians and his numerous foreign friends we wish him the best of health so that he can carry them out.

SUPPLEMENT TO THE LIST OF SCIENTIFIC PUBLICATIONS OF PROFESSOR VOJTĚCH JARNÍK

A

86. Eine Bemerkung zum Übertragungssatz, Известия на математическия институт (Bulgarian Ac. Sci.) vol. *3*, book 2 (1959) 170–175.
87. Eine Bemerkung über diophantische Approximationen, Math. Zeitschr. *72* (1959) 187–191.
88. Zur Gitterpunktslehre von mehrdimensionalen Ellipsoiden, Acta Aritmetica *9* (1964) 321–329.

B

6. Approximations diophantiennes linéaires et homogènes, Proceedings of the Int. Congr. 1954 Amsterdam Vol. *I* (1957) 430.

C

14. Diferenciální počet I (Differential calculus I), 5th edition 1963, NČSAV, 390 p.
15. Integrální počet I (Integral calculus I) 4th edition 1963, NČSAV, 243 p.
16. Differenciální rovnice v reálném oboru (Differential equations in real domain). According to the lecture of Prof. Jarník treated by Vladimír Petrův. Učební texty vysokých škol, Státní pedag. naklad. 1963, offset, 245 p.

17. Matematická analýza pro 3. semestr (Mathematical analysis for the 3rd semester of studies). Učební texty vysokých škol, Státní pedag. naklad. 1965, rotaprint, 246 p.

D

36. J. W. S. Cassels, An Introduction to Diophantine Approximations (review) Časopis 84 (1959) 212–216.
37. A. Walfisz, Gitterpunkte in mehrdimensionalen Kugeln (review) Časopis *85* (1960) 109–112.
38. K. Prachar, Primzahlverteilung; W. Specht, Elementare Beweise der Primzahlsätze (review) Časopis *85* (1960) 364–392.
39. Bernard Bolzano (5. 10. 1781–18. 12. 1848) Czech. Math. Journ. *86* (1961) 485–489, in Czech version Časopis *87* (1962) 107–111.
40. Carl Ludwig Siegel, Gesammelte Abhandlungen I–III. Časopis *92* (1967), 481–485.