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Miloš Kössler (1884–1961)

LIFE AND WORK OF PROF. MILOŠ KÖSSLER

Pavla Drábková

Prof. Kössler (19. 6. 1884–8. 2. 1961) was a Czech mathematician who was active in the first half of the 20th century. He was a brilliant specialist in the theory of analytic functions and number theory, but above of all he was an excellent teacher. This year we have commemorated the 40^{th} anniversary of his death.

1 Life

Childhood and studies

Miloš Kössler was born in a poor family in Prague on June 19, 1884. His father was employed in Braník brewery as a head of a restaurant. His mother died when the boy was only five years old. Young Miloš didn't seem to follow in his father's footsteps in the business, so he started studying at a secondary school called "Academic Gymnasium" (Prague I, Štěpánská Street). He passed his final examination in 1903.

After that he became a student of the Faculty of Arts in Prague. During his studies (1903–1908) he was influenced mostly by his teacher Karel Petr (1868–1950), Professor of Charles University, who was called out from Brno to Prague after death of František Josef Studnička (1836–1903) and Eduard Weyr (1852–1903). Petr's coming signified a big break in teaching mathematics at the university. Kössler was one of his best students and after graduation also followers. In 1928 he compiled (together with František Nušl) a celebrating biography of "their master and friend" to honour his birthday, named *Karel Petr. Short syllabus of his life and a short review of his work*. The academian Eduard Čech (1893–1960) wrote in his paper ([1]):

> *Kössler better than no one else comprehended some of the best aspects of our unforgettable teacher Karel Petr and went seriously fine by Petr's magnificent example.*

The study of mathematics, physics, and astronomy did not bring good applications for real life in that period – most mathematicians were teaching at secondary schools. But there were too many teachers for very few positions in schools at the beginning of the 20^{th} century. KÖSSLER couldn't find a job during three years after finishing his studies, so he earned his living by private lessons.

Active career

KÖSSLER got his first permanent job in 1910. He became a teacher at a secondary school in Domažlice, and one year later in Prague.

In 1911 he married his colleague – Miss ZDEŇKA VINTRICHOVÁ, who was also a teacher of mathematics and physics. They had three children, but the youngest girl died at the age of six. Mrs ZDEŇKA KÖSSLER died in 1938 just before World War II.

In 1918 MILOŠ KÖSSLER recieved the degree of Associate Professor ("Docent") at the Faculty of Arts. During the twenties he got an offer to teach in Brno at the Technical University, but he didn't want to leave Prague. In December 1922 he was appointed Extraordinary Professor of the Faculty of Arts of Charles University (present Faculty of Mathematics and Physics). After five years he became full Professor. From 1935 till 1936 he was Dean at the same faculty. In 1956 he ended his active career at the university.

Scientific organizations

From 1923, KÖSSLER was a member of the Czech Royal Society of Science. In this organization he took a position of general secretary after the announcement of death of PROF. ZÁVIŠKA in 1945 until 1949.

He did a great deal of work in the Union of Czech Mathematicians and Physicists, especially during occupation after closing of all Czech institutions of higher education in November 1939. He worked actively in its Central Comitee, from 1917 till 1926 as a librarian. In 1939 he was elected protector of the Union.

Prof. Miloš Kössler was named corresponding member of the Czech Academy in 1953. He died on February 2, 1961.

Hobbies

Speaking about his hobbies we can't forget playing tennis – he was a really good player of that game and he was also very active during building of the Albertov's courtes. He was one of the first Prague's

skiers. From desk plays he preferred chess and "taroky" (he played them with a few friends for many years).

Personality

I think that one of the best ways how to learn Kössler's personality could be reading the retrospect written by E. Čech (see [1]):

> *There were a lot of things connected with Miloš Kössler that magnetized me. I saw a model in him. First, it was the spontaneity of his interest in mathematics and the enthusiasm for tireless study he couldn't imagine life without. Second, it was extreme kindness, impossibility to hurt anyone anyway and ambition for unselfish help everywhere it was necessary. Third, it was his unconditional faithfulness ... related with modesty frequently excessive ...*

2 Work

Pedagogical activities

Kössler took great care about the style of his lectures. He led courses of mathematical analysis in complex domain, courses on differential equations, on special functions, on number theory, ...

Many Czech mathematicians commemorated and still commemorate their teacher and examiner with gratefulness. He loved his branch, he had profound knowledge of the subject and was able to engage his students. Kössler was deeply interested in physics. That was the reason why he always estimated which parts of mathematics would students – physicists need in their future work. They came to him for advice also after their graduation.

Publications

M. Kössler published 32 papers – mainly from two various fields of mathematics: mathematical analysis in complex domain and the theory of numbers. His work was published in Czech, English, German, French, and Russian.

Perhaps only two papers belong to different areas of mathematics. One of them – "On minimal graphs containing n given points" ([10]) was written together with Vojtěch Jarník (1897–1970). It is a "pioneering

work" in combinatorial optimization and it is discussed in [11], pp. 37–51. The second one ([9]) was inspired by Greek mathematics. It deals with a problem of commensurability of angles, especially in right angled triangles.

KÖSSLER also wrote a textbook for students at the faculty, named *Introduction to the differential calculus*. Before the World War II there wasn't enough Czech textbooks on analysis – therefore it was very helpfull for the students. In 1938 V. JARNÍK wrote *Introduction to the integral calculus* as an installment of KÖSSLER's book and in 1946 he published his own *Introduction to the differential calculus* as the 1st edition of *Differential calculus I*. Jarník's well-known *Differential calculus I, II* and *Integral calculus I, II* were set out also only after war.

Number theory

PROF. KÖSSLER dealt with many problems from this branch of mathematics. He preferred "elementary" methods for solving them, but it was a little bit difficult sometimes. His papers ([6], [7]) are devoted to the study of Riemann's zeta function

$$\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s}\,, \quad \Re(s) > 1\,,$$

one of the greatest phenomena in problems dealing with distribution of prime numbers. He tried to think over Riemann's hypothesis about the roots of this function, but he did not published these fragments – they were found in his diary.

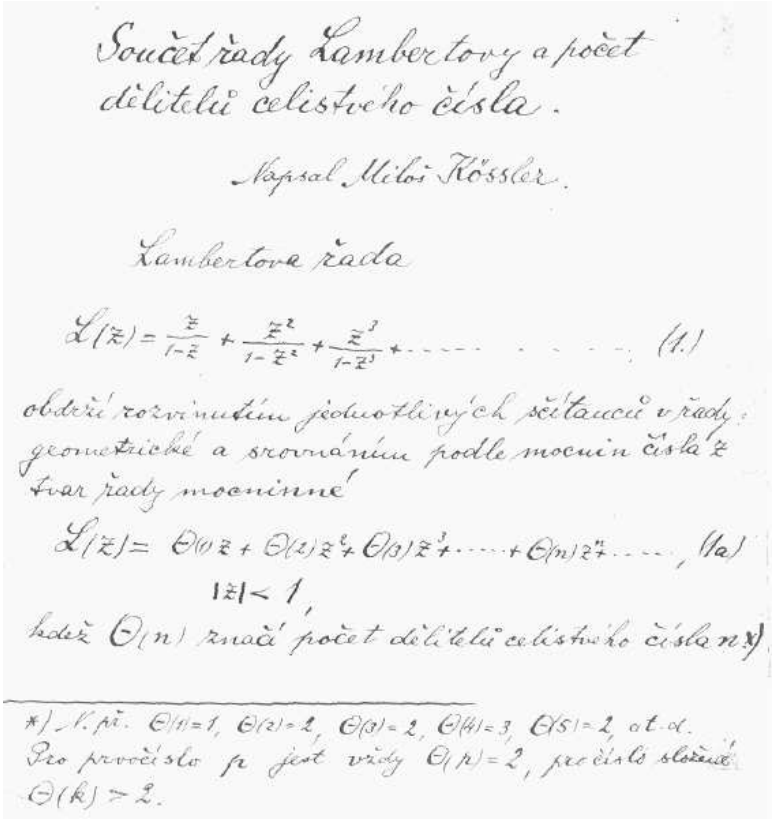
Early articles ([4], [5]) handled some problems devoted to prime numbers, Lambert's series, quantity of dividers of integers, etc.

KÖSSLER also tested finding solutions with a special kind of identity which appeared in [8]. Let us think over a sequence of natural numbers $q_1 < q_2 < q_3 < \cdots$ and two functions $f(n)$, $v(n)$, let $N \in \mathbb{N}$. KÖSSLER defined two other functions

$$V(k) = \sum_{n=1}^{\left\lfloor \frac{N}{k} \right\rfloor} v(nk)\,,\ F(n) = \sum_{q_k | n} f(q_k)$$

and affirmed that

$$\sum_{q_k \le N} f(q_k) \cdot V(q_k) = \sum_{n=1}^{N} F(n) v(n)\,.$$


Součet řady Lambertovy a počet dělitelů celistvého čísla.

Napsal Miloš Kössler.

Lambertova řada

$$L(z) = \frac{z}{1-z} + \frac{z^2}{1-z^2} + \frac{z^3}{1-z^3} + \dots \quad (1.)$$

obdrží rozvinutím jednotlivých sčítanců v řady geometrické a sroznáním podle mocnin čísla z tvar řady mocninné

$$L(z) = \Theta(1)z + \Theta(2)z^2 + \Theta(3)z^3 + \dots + \Theta(n)z^n + \dots, \quad (1a)$$

$$|z| < 1,$$

kdež $\Theta(n)$ značí počet dělitelů celistvého čísla n *)

*) Např. $\Theta(1)=1$, $\Theta(2)=2$, $\Theta(3)=2$, $\Theta(4)=3$, $\Theta(5)=2$, atd. Pro prvočíslo p jest vždy $\Theta(p)=2$, pročíslo složené $\Theta(k)>2$.

A small sample of Kössler's manuscript

When we choose various $f(n)$, $v(n)$, we obtain a lot of miscellaneous identities. KÖSSLER hoped that some of these identities would help to get better acquainted with prime numbers.

Analytic functions

There is not enough space to recount KÖSSLER's production from this branch in detail – it would be very difficult because we'd need a lot of definitions, propositions, theorems, etc. Just for imagination what problems KÖSSLER solved, here are the names of some of his articles:

- On a zonal harmonic function
- On a generalization of the Lagrange series

- On the singularities of power series, laying on the cifcumference of the circle of convergence
- The signification of the number $\sup |a_n|^{\frac{1}{n}}$ in the theory of power series

Diaries

PROF. KÖSSLER used a "diary-form" for recording his scholastic work. Whenever he got an idea he wrote it in his diary with the relevant date. Nearly two thirds of the diaries were unfortunately lost, but the last third (from years 1948–1956) was saved. It contains a lot of ideas and rigorous scientific calculations. Occasionally some personal opinions and thoughts or philosophical meditations turned up there, e.g. 4. 3. 1949 *E.Luiklater: Juan in China, Chap.XV.*

> *Work is the deadliest of the perversions. The natural instinct of natural man is to avoid work, and nothing shows more clearly the degeneracy of the modern world than the fact that work has become a social jewel, something to be sought with favour, even a rarity, a prize for those who most closely resemble the ant, the pismire, the detestable insect that never raises its head. ... I say work's a perversion, and so it is; everything except pure and volunteery creation. But it isn't recognized as a perversion because its results are profitable. But no one who has worked for twenty years – and when I say worked, I mean laboured for hire – can either see clearly, hear with certainty, think straight, or feel ecstasy.*

These books include many interesting unpublished themes for solutions of many problems which could bring an inspiration for the next generations of mathematicians.

A great part of these diaries is devoted to simple polynomials. We say that

$$P(z) = z + a_2 z^2 + a_3 z^3 + \cdots + a_n z^n \,, |a_n| > 0$$

is a simple polynomial in and on the closed circle $|z| \leq 1$ if there is $r > 1$ such that $P(z_1) \neq P(z_2)$ for $z_1 \neq z_2$, $|z_1| < r$, $|z_2| < r$. KÖSSLER tried to discuss the necessary and sufficient conditions for $(*)$ to be simple in many special cases.

Some other parts are devoted to the four-colour problem, Riemann's zeta function hypothesis, distribution of primes in special arithmetical

sequences, Euler's function, trigonometrical and algebraic finite polynomials, Legendre's symbol, lattice points, etc.

3 Conclusion

Prof. Kössler (as a human being) was a very modest and tolerant man. He was always ready to help. It would be wrong to say that (as a scientist) he achieved grandiose and definite results every time, but his importance consists above all in his educational mastership. We should not forget people who helped to start the great development of Czech mathematics in the 20th century, and Miloš Kössler was one of them.

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