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The late Professor Karel Rektorys

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## THE LATE PROFESSOR KAREL REKTORYS

The life of the late Professor Karel Rektorys spans from February 4, 1923, when he was born in Písek in South Bohemia, to December 10, 2004, when he died in Prague. Although longer than the average, his life was too short. Since his gifts were so numerous, he should have been given more than one life to use them fully.

It is not common for a mathematician to be well-known in a broad engineering community. Karel Rektorys was an exception. He was the main editor of and contributor to the famous handbook *Survey of Applicable Mathematics* (SAM; first in Czech, then in English), so popular in technical and applied sciences.



Later, his *Variational Methods in Mathematics, Science and Engineering* appeared in Czech, and then were translated into English, German, and Russian. In this book, he built an accessible, but mathematically sound way to a rather demanding field of applied mathematics.

Mathematicians and especially numerical analysts also know his monograph *The Method of Discretization in Time and Partial Differential Equations*, a ripe fruit of his involvement in solving thermal problems arising during the construction of Orlik dam. I cannot imagine the Rothe method without mentioning Karel Rektorys, its promoter, too.

I first met Karel at a conference some 40 years ago. We shared a table in a dining room, which helped to establish our friendship. After the conference, I dared to approach him for help in solving a mathematical trifle that annoyed me. In his cordial reply to my short letter, he mentioned *our* problem and solved it.

I had an opportunity to appreciate both Karel's mathematical instinct and his deep insight into mathematics when I was attracted to proofs of the Green-Gauss-Ostrogradskij (GGO) theorem. I was familiar with a proof that used the partition of unity method. I wished to avoid the partition of unity because we are usually not able to determine it in practice.

The GGO theorem is nicely formulated in *SAM*, but, of course, not proved there. I called my friend Karel and asked him for a pointer to a proof. He referred me to the third volume of Fichtëngolc' (Fichtenholz) monograph on calculus. I borrowed the book and delved into it, but the proof seemed to me rather obscure.

I called Karel again and told him about my troubles. He replied, "Well, I didn't study the proof in detail. In my opinion, however, the idea is clear. Try to use it, and write a proof that will satisfy you. The result can be interesting and worth publishing."

I spent more than three years working on the proof. The resulting paper has 73 pages. Although the partition of unity method is not applied, all Nečas' results concerning the surface integral are proved there.

I was lucky to witness more evidence of his foresight. Years ago, I needed an extension theorem for the Sobolev-Sloboděckij space  $H^{1+\varepsilon}(\Omega)$  ( $0 < \varepsilon < 1$ ). I had not found anything in the available literature, so that I asked Karel. He promptly answered, "You must generalize extensions of the Nikolskij type for Sobolev spaces  $H^k(\Omega)$  where the boundary  $\partial\Omega$  is only Lipschitz continuous, and then use abstract interpolation between Banach spaces." Good advice, but the way to its realization was longer than the way to Tipperary. I finished just in time to dedicate my paper to Karel on the occasion of his 80th birthday.

Karel Rektorys was both an excellent mathematician and an excellent teacher. However, there were situations demanding an inclination to this or that role.

When we once traveled by train and conversed, I acknowledged his book on variational methods, which gave me a model for explaining some parts of mathematics in my lecture notes. However, I did not hesitate to warn him of an inaccuracy in the definition of the Sobolev space in Remark 29.4. Karel knew about it and sighed, "How to resolve contention between a methodical approach and a highly accurate approach in a book for beginners? Nevertheless, I shall think it over."

Just recently, I browsed through the 1999 edition of that book and found Remark 29.4 unchanged. Karel had decided to prefer the methodical approach. He knew that a numerical analyst would also read other books and not only his book written for beginners.

I have to thank Karel for many good pieces of advice, for fruitful discussions, for his kindness and readiness to help. He was a good friend and a great man. I shall miss him.

*Alexander Ženíšek*