Mathematica Slovaca

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Mathematica Slovaca, Vol. 52 (2002), No. 4, 485--490

Persistent URL: `http://dml.cz/dmlcz/136869`

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PROFESSOR ŠEDA, SEPTUAGENERIAN

There are a lot of students who cannot forget the great impression of his lectures. Not only for their mathematical clarity and perfection, but also for his ability to feel the very moment when the student's attention was lost. Then it was time for a short break and a funny story narrated by the lecturer. (The preparation of these short stories for the amusement of tired students is one of his unsufficiently appreciated activities.)

It is hardly to believe that Professor Šeda (with his endless optimism, readiness to help his colleagues and students and his energy) is a septuagenerian.

He was born on April 11, 1931 in Sereď. In 1949, after the school-leaving examination at the secondary school in Kežmarok, he entered the Faculty of Natural Sciences of the Comenius University. The university studies were followed by postgraduate study of Mathematics from 1953 till 1956 under supervision of Academician Jur Hronec and Academician Otakar Borůvka. Since 1952 he has been employed by his Alma Mater with a short break from 1968 till 1970, when he was a lecturer in the College of Sciences of the University of Baghdad. He obtained his PhD-degree in 1957; in 1964 he was appointed Associate Professor of Mathematics and in 1982 Full Professor. In the same year he obtained his Doctor of Science-degree.

From the large number of his scientific and pedagogical activities let us mention the Seminar on Ordinary and Functional Differential Equations which has worked under his guidance since 1965 and which became a legend for Slovak mathematicians working in this field.

A more detailed description of the scientific work of Professor Šeda till the beginning of the nineties can be found in [GH], so let us only mention the main areas of his research, then we will pay attention to Šeda's papers written during last 10 years.

His first steps made under the influence of Academician Borůvka were focused on the theory of differential equations of the second order in a complex domain. The transformation of differential equations, properties of DE of the second order in the open plane and in the unit ball, and the distribution of the zero points were studied. In the middle of the sixties he worked out the theory of transformation of linear differential equations of the nth order, especially he examined the relation of transformable differential equations to the distribution of the zero points of their solutions. Another area, to which Professor Šeda paid attention mainly in the eighties, are t-asymptotic properties of linear and non-linear differential equations and systems. In the eighties, three papers were dedicated to the theory of differential and functional differential equations with deviating argument. Since the end of the sixties, the main part of his research is dedicated to boundary value problems for ordinary and functional differential equations; this was also the subject of his Doctor of Sciences dissertation.

One of the subjects of Šeda's scientific work in the last decade is the generalized boundary value problem, by which we understand an equation with boundary conditions given by continuous linear functionals (see [58], [60], [61]). Properties of the operator (in general, a non-linear one) defined by such a problem, the question whether it is a surjection or a homeomorphism, the cardinality of preimages of a given point, its generic properties and the bifurcation problem were studied. Professor Šeda here uses and generalizes results of Ambrosetti, Smale-Quin, Cacciopoli, Brüll and Mawhin.

In the paper [54] published at the beginning of the nineties the structure of the solution set of the two-point BVP

$$u^{(n)} + p_1(t)u^{(n-1)} + \cdots + p_n(t)u = f(t,u)\,,$$
$$B_i(u) = 0$$

is studied; here the technique of upper and lower solutions is used.

This technique can also be found in other papers of Professor Šeda, this time in connection with existence and structure of the fixed point set of isotone and antitone operators. He exploited results of Mawhin and Brüll and his own results on discrete dynamical systems and generalizes the monotone iterative technique (originally worked up by Lakshmikanthan) for α-condensing antitone operators (see [62]).

The structure of fixed point sets for α-condensing maps without the assumption of monotonicity is examined by Professor Šeda in his work on discrete dynamical systems; here his results are related to those obtained by Krasnoseľskij, Lusnikov, Takáč and Hess (see [63]).

Four papers of Professor Šeda (with co-authors) written during the last decade are devoted to Aronszajn type-properties of the solution set of functional differential equations; three of them ([55], [56], [57]) for an initial value problem, the fourth one ([65]) for a BVP. The first three of these papers are concerned with the structure of the solution set of the initial value problem for the functional differential equation

$$x^{(p)}(t) = f\big(t, x_t, x'_t, \dots, x_t^{(p-1)}\big)\,, \qquad t \in [b,\infty)\,,$$

on an unbounded interval. Here x_t denotes the restriction of x to the interval $[t-h,t]$, where $h > 0$ is fixed. It is proved that (under certain conditions) the solution set belonging to an appropriate set M is a nonempty compact.

In the paper [65] *R_δ-set of solutions to a boundary value problem*, the structure of solutions to a BVP is studied (this topic for BVP is less detailed than for the initial value problems). The equation

$$x^{(n)} + p_1(t)x^{(n-1)} + \cdots + p_n(t)x + f\big(t, x, \dots, x^{(m)}\big) = q(t)$$

on a compact interval with linear boundary conditions is examined. Using his own results and those of Bebernes and Jackson (describing conditions on f for the equation to have the uniqueness property for each q) Šeda stated conditions under which the solution set of the given equation is an R_δ.

In the paper [64] *A Remark to the Schauder Fixed Point Theorem* (dedicated to the memory of Julius Schauder on the occasion of the centenary of his birth) sufficient conditions for existence of fixed points are stated for a continuous mapping $T\colon M \to M$ (where M is a closed convex subset of a Banach space). The proofs are based on the Schauder fixed point theorem and their merit (in comparison with some other proofs of similar statements) is their elementary character without use of algebraic topology.

The scientific and pedagogical work of Professor Šeda was and still is a constant inspiration for his students and his colleagues. We wish Professor Šeda good health and happiness in his life and hope that destiny will provide us many more years to enjoy his presence.

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Zbyněk Kubáček
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