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JATBits

Welcome to the JATBits, where you will find timely bits and pieces about the past, the present, and the future of approximation theory!

The past: where we look at the giants who were born, or died, $100\,n$ or $100\,n+50$ years ago, some great theorem or treatise that deserves to be recalled, or any other landmark from history.

The present: who is having a big anniversary party, prizes recently awarded, solutions of famous problems, recent Ph.D.'s in the field, and so forth.

The future: where we try to gather information regarding meetings to be held soon or whatever may (predictably) happen.

So please, send us information and contributions, preferably, but not necessarily, by e-mail.

By the way, if you are connected to the net, you have access to information concerning the Journal at http://www.math.ohio-state.edu/JAT.

HISTORY

We have been able to identify some names and anniversaries very quickly thanks to the electronic History of Mathematics archive developed by John O'Connor and Edmund F. Robertson, of the School of Mathematical and Computational Sciences, University of St. Andrews. (The archive is available at http://www-groups.dcs.st-and.ac.uk.) Here are the first two anniversaries; there will be others in later JATBits columns.

Yevgeny Yakovlevich Remez was born 100 years ago, on February 17, 1896, and died on August 31, 1975. He was educated in Kiev and became a Professor at Kiev University in 1935. He developed general computational methods of Chebyshev approximation, especially the "Remez algorithm," which computes best uniform approximations from Chebyshev systems. He also generalized the Chebyshev–Markov characterization theory, proved inequalities about polynomials, and created general operator methods of sequence approximation. (Adapted from text by John O'Connor and Edmund F. Robertson.)

A basic polynomial inequality established by Remez in 1936 is known as the Remez inequality. It gives a sharp uniform bound on $[-1, 1]$ for real algebraic polynomials p of degree at most n if the Lebesgue measure of the subset of $[-1, 1]$, where $|p(x)|$ is at most 1, is known. Remez' short and beautiful proof based on Lagrange interpolation may have been forgotten;

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some books present longer and more technical proofs. In addition to its shortness, Remez' proof extends (although nontrivially) to exponential sums (Müntz polynomials), and leads to the solution of some natural problems such as the characterization of sequences $(\lambda_k)_{k=0}^{\infty}$ for which span$\{x^{\lambda_0}, x^{\lambda_1}, \ldots\}$ is dense on every compact subset of $[0, \infty)$ with positive Lebesgue measure. There are applications of the Remez inequality in the theory of orthogonal polynomials as well. Remez-type inequalities give bounds for functions from certain classes on a line segment, a curve, or a region of the complex plane, given that the modulus of the function is bounded by 1 on a subset of prescribed measure. In some cases these play a central role in proving other important inequalities. [Contributed by Tamás Erdélyi (e-mail: tamas.erdelyi@math.tamu.edu).]

Harry Bateman died 50 years ago, on January 21, 1946. He was born on May 29, 1882, in England. After being educated there, he came to the United States in 1910. He is famous for his work on special functions and partial differential equations. Planning to write a gigantic "Guide to the Functions," he accumulated a vast store of information on all of the familiar special functions. After his death, A. Erdélyi and his associates undertook the publication of the "Bateman Manuscript" in the form of the well known series of volumes "Higher Transcendental Functions" and "Tables of Integral Transforms" (McGraw–Hill, 1953, 1955).

A new project to create a (possibly electronic) encyclopedia of special functions has been recently launched. It is called the "Askey–Bateman" project and is headed by Mourad Ismail (Department of Mathematics, University of South Florida, Tampa, Florida 33620-5700, e-mail: ismail@math.usf.edu) and Walter Van Assche (Department of Mathematics, Katholieke Universiteit Leuven, Celestijnenlaan 200 B, Leuven (Heverlee), B-3001, Belgium, e-mail: walter@wis.kuleuven.ac.be). Contributions to this project are welcome!

Query

It is believed that the first use of the term "metric projection" occurs in the paper of Aronszajn and Smith on the invariant subspace problem, (*Ann. of Math. (2)* **60**, 1954, 345–350). Do any of our readers have a prior reference? [Contributed by Frank Deutsch (e-mail: deutsch@math.psu.edu).]

Prizes and Honors

Albert Cohen was awarded the first Popov Prize at the Eighth Texas Conference on Approximation Theory, January 9, 1995. This award, to be

presented once every three years, is given to young mathematicians for outstanding research contributions in approximation theory and/or related areas.

By a strange coincidence, one of us (W.C.) happened to reach age 65 in time for the Texas conference, and notice was taken of that anniversary at the meeting.

Charles A. Micchelli from IBM (Yorktown Heights), and an editor of the Journal, received a Doctor Honoris Causa from the University of Zaragoza, Spain. The ceremony took place in the Paraninfo of the University on Tuesday, December 13, 1994.

Chronicle

M. J. D. Powell will be 60 years old on July 29, 1996.

T. J. Rivlin will be 70 years old on September 11, 1996.

By another coincidence, one of us (A.M.) will be 50 years old during the coming year, but there will be no associated meeting, nor do we know (yet) of any medals to be struck in his honor.

New Ph.D.'s

Gregory Fasshauer, Vanderbilt University. Advisor: Larry Schumaker. Title of Dissertation: "Radial Basis Functions on Spheres."

Michael Johnson, University of Wisconsin. Advisor: Amos Ron. Title of Dissertation: "Approximation in L_p-Norm from Principal Shift-Invariant Spaces."

Haewon Joung, The Ohio State University, August, 1995. Advisor: Paul Nevai. Title of Dissertation: "Generalized-Polynomial Inequalities."

Ferenc Pintér, The Ohio State University, March, 1995. Advisor: Paul Nevai. Title of Dissertation: "Perturbation of Orthogonal Polynomials on an Arc of the Unit Circle."

Ann Sinap, Katholieke Universiteit Leuven, March, 1995. Advisor: Walter Van Assche. Title of Dissertation: "Computational Aspects of Orthogonal Matrix Polynomials."

Shayne Waldron, University of Wisconsin. Advisor: Carl de Boor. Title of Dissertation: "L_2-Error Bounds for Multivariate Polynomial Interpolation Schemes."

John Zhang, The Ohio State University, March, 1995. Advisor: Paul Nevai. Title of Dissertation: "Orthogonal Polynomials, Selected Topics and Applications."

Our congratulations to all!

New Journal

A new journal entitled *Eastern Journal on Approximations* was started in March 1995. For further information contact Borislav Bojanov (e-mail: bor@bgearn.bitnet).

Meetings

Special session on "Computational Harmonic Analysis and Approximation Theory," AMS Meeting, Orlando, January 1996. Organizer: Richard Zalik (Department of Mathematics, 218 Parker, Auburn University, Alabama 36849-5310, e-mail: zalik@mail.auburn.edu).

Conference on Numerical Mathematics: 60th Birthday of M.J.D. Powell, University of Cambridge, England; July 27–30, 1996. Organizers: M. D. Buhmann (Mathematics Department, ETH Zentrum, 8092 Zurich, Switzerland, e-mail: mdb@math.ethz.ch), and A. Iserles (Department of Applied Mathematics and Theoretical Physics, Silver Street, Cambridge CB3 9EW, England, e-mail: ai@damtp.cam.ac.uk).

Quotation

The following was contributed by Peter Borwein (e-mail: pborwein@cecm.sfu.ca).

> It seems to me that the mine is already almost too deep, and unless we discover new seams we shall sooner or later have to abandon it. Today Physics and Chemistry offer more brilliant and more easily exploited riches; and it seems that the taste of the century has turned entirely in that direction. It is not impossible that the mathematical positions in the Academies will one day become what the University chairs in Arabic are now. (J. L. Lagrange, 1736–1813)

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