
MathFest 2013

Prizes and Awards



MAA

MATHEMATICAL ASSOCIATION OF AMERICA

Hartford, Connecticut
11:30am
August 2, 2013

Program for the MAA Prize Session

Opening and Closing Remarks

Bob Devaney, President

Mathematical Association of America

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Carl B. Allendoerfer Awards

The Carl B. Allendoerfer Awards, established in 1976, are made to authors of articles of expository excellence published in *Mathematics Magazine*. The Awards are named for Carl B. Allendoerfer, a distinguished mathematician at the University of Washington and President of the Mathematical Association of America, 1959-60.

Khristo N. Boyadzhiev

“Close Encounters with the Stirling Numbers of the Second Kind”, *Mathematics Magazine*, Volume 85, Number 4, October 2012, pages 252-266.

The Scottish mathematician James Stirling, in his 1730 book *Methodus Differentialis*, explored Newton series, which are expansions of functions in terms of difference polynomials. The coefficients of these polynomials, computed using finite differences, are the Stirling numbers of the second kind. Curiously, they arise in many other ways, ranging from scalar products of vectors of integer powers with vectors of binomial coefficients to polynomials that can be used to compute the derivatives of $\tan x$ and $\sec x$. This well-written exploration of Stirling numbers visits the work of Stirling, Newton, Grünert, Euler and Jacob Bernoulli. Boyadzhiev’s fascinating historical survey centers on the representation of Stirling numbers of the second kind by a binomial transform formula. This might suggest a combinatorial approach to the study, but the article is novel in its analytical approach that mixes combinatorics and analysis. Grounded in Stirling’s early work on Newton series, this analytical approach illustrates the value of considering alternatives to Taylor’s series when expressing a function as a polynomial series. The story of Stirling numbers continues with the exponential polynomials of Johann Grünert and geometric polynomials in the works of Euler. Boyadzhiev shows the relation of Stirling numbers of the second kind to the Bernoulli numbers and Euler polynomials. The article closes with a brief look at Stirling numbers of the first kind, a nice touch that deftly brings the

proceedings to a close. Boyadzhiev's lively exposition engages the reader and leaves one eager to learn more.

Response from Khristo N. Boyadzhiev

The Allendoerfer Award is an exciting milestone in my life. I am truly honored to be recognized by the Mathematical Association of America. With its mission and especially with its publishing operation the MAA unites and educates a vast mathematical community. *The Mathematics Magazine*, the *College Mathematics Journal*, the *Monthly*, and *Math Horizons* have become my good friends. Students and professors all over the world read them, discuss them, send materials, and work on the problem sections. What a treasure these journals are!

For my review on the Stirling numbers, I was inspired by the magic interplay between analysis and combinatorics. I was also inspired by the works of Henry W. Gould, Professor Emeritus at West Virginia University, who has a special taste for beautiful combinatorial identities. I am obliged to the editor Walter Stromquist for his friendly and competent help in bringing the manuscript to its final form. Thank you all!

Biographical Note

Khristo Boyadzhiev is a Professor of Mathematics at Ohio Northern University. He was born and educated in Sofia, Bulgaria. Khristo enrolled at Sofia University, "St. Kliment Ohridski", with the intention to study physics, but the calculus lectures of Yaroslav Tagamlitski changed his mind. Later Tagamlitski became his PhD advisor.

At the beginning of his career Khristo was interested mostly in Banach algebras and operator theory. Later in life he developed a steady interest in classical analysis.

He is married and has two daughters. In his spare time Khristo enjoys blogging, taking long walks around the beautiful ONU campus, and listening to classical music.