



Identities of A. I. Popov

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Date: 2 June 2017 (Friday)
Time: 10.30am – 11.30am
**Venue: MAS Executive Classroom 2 #03-07,
School of Physical and Mathematical Sciences**

Abstract

A. I. Popov was a Russian mathematician who wrote 13 papers in the 1930's. His mathematical papers have been forgotten, but his work in toponymics (the study of the origins of place names in countries) provided him with fame that has lasted through the present.

Popov's mathematical contributions centered on formulas involving $r_k(n)$, the number of representations of the positive integer n as the sum of k squares. Special functions, in particular, Bessel functions, appear in many of his formulas. Often, he did not provide proofs, and some of the proofs that he did provide are not rigorous. Several of Popov's theorems are discussed in this lecture. In particular, in 1934, Popov stated, but did not prove, a beautiful series transformation involving $r_k(n)$ and certain Bessel functions. We provide a proof of this identity for the first time as well as for another identity, which can be regarded as both an analogue of Popov's identity and an identity involving $r_2(n)$ from Ramanujan's lost notebook.

The contents of this lecture are taken from two unpublished papers that the author has written with Atul Dixit, Sun Kim, and Alexandru Zaharescu.

Speaker Biography

Born in St. Joseph, Michigan, Bruce Carl Berndt graduated from Albion College in 1961, where he studied mathematics and physics, and ran track. He received his doctoral degree from the University of Wisconsin-Madison in 1966. After lecturing for one year at the University of Glasgow, in 1967, he assumed a position at the University of Illinois at Urbana-Champaign, where he has remained since. Berndt is an analytic number theorist who for over 40 years has devoted almost all of his research efforts toward proving the claims left behind by Ramanujan in his earlier notebooks and lost notebook. In 1996, Berndt was awarded the Steele Prize for Exposition from the American Mathematical Society for his volumes on Ramanujan's notebooks. With George Andrews, he is currently preparing volumes on Ramanujan's lost notebook. Berndt is especially proud of and thankful for the thirty-five students who have completed their Ph.D. degrees under his direction.

Host: Associate Professor Chan Song Heng
Division of Mathematical Sciences, School of Physical and Mathematical Sciences