Partition Dynamics

Prof. Brian Hopkins
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Date: 19 January 2012 (Thursday)
Time: 4.30pm – 5.30pm
Venue: SPMS-LT5, SPMS-03-08
School of Physical and Mathematical Sciences

We will explore the impact of ideas from dynamical systems on the venerable topic of integer partitions. Given an operation on partitions, the partitions of a fixed integer can be thought of as a finite dynamical system. There are three immediate natural questions: How many components are in the system? Which partitions are fixed points or in cycles? Which partitions are Garden of Eden states, with no predecessor? Answers to these questions use generating functions and combinatorial proofs. This approach helps in analyzing Bulgarian Solitaire popularized by Martin Gardner and various sand pile model examples of “self-organized criticality” in theoretical physics. It can also be enlightening to “operationalize” bijections of partition identities, such as Glaisher’s proof that there are as many partitions of n into distinct parts as there are partitions of n into just odd parts.

Speaker Biography

Prof. Brian Hopkins is an associate professor of mathematics at Saint Peter’s College, a Jesuit liberal arts college in Jersey City, New Jersey, near New York City. He received bachelor’s degrees in mathematics and philosophy from the University of Texas in 1990, and his Ph.D. from the University of Washington in 1997 for work in algebraic combinatorics related to the representation theory of Lie algebras. Current professional interests include partition theory, Rado numbers, mathematics motivated by social science, and teacher professional development. With Robin Wilson of Oxford University he received the 2005 George Pólya Award for expository excellence for the article "The Truth About Königsberg" and in 2011 he was recognized as the Distinguished Teacher of the Year by the New Jersey section of the Mathematical Association of America.

Host: Division of Mathematical Sciences, School of Physical and Mathematical Sciences