Temple University Mathematics Colloquium

Bruce Sagan
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will speak on

Graph coloring and symmetric functions

Let $G$ be a combinatorial graph with vertices $V$ and edges $E$. A proper coloring of $G$ is a function $c$ from $V$ to $\{1, 2, \ldots, n\}$ such that if $uv$ is an edge then $c(u)$ does not equal $c(v)$. This is the same restriction as in the famous Four Color Theorem. In 1912–13, Birkhoff showed that the number of proper colorings is a polynomial in $n$, called the chromatic polynomial $P(G; n)$, which has many wonderful properties. More recently, Stanley showed that one can associate with $G$ a symmetric function $X(G; x)$ which reduces to $P(G; n)$ under specialization of the variable set $x$. But $P(G; n)$ satisfies a deletion-contraction law which is useful for inductive proofs of its properties, while $X(G; x)$ does not. We will show how one can derive such a law using symmetric functions in noncommuting variables and give applications. No background about graph coloring or symmetric functions will be assumed.

Monday, January 24, 2005
Lecture at 4:00 PM (#)
Coffee, tea, and refreshments from 3-5 PM.
Room 617, Wachman Building
Department of Mathematics