DEPT OF MATHEMATICS AND STATISTICS • COLLOQUIA 2011–12

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Graph Isomorphisms in Discrete Morse Theory

ABSTRACT

Discrete Morse theory is a new and exciting area of mathematics. It combines aspects algebra, combinatorics, and topology. In this talk, we will introduce discrete Morse theory on graphs. We discuss an existing notion of equivalence between discrete Morse functions based on a sequence of homology groups (we'll discuss what this means) of the corresponding subgraphs of G. We then use the homology sequence to study a new notion of equivalence between discrete Morse functions. This equivalence is based on the isomorphism type of the subgraphs of G. We count the number of equivalence classes on star graphs S_n and deduce an upper bound for the number of equivalence classes for a collection of graphs. This talk is based on work done at an REU at Ursinus College during Summer 2011 and should be accessible to undergraduates.

TUESDAY, OCTOBER 18, 2011 • TEA AT 4:15, TALK AT 4:30 • SCIENCE CENTER 199