

UCCS Department of Mathematics

Math Colloquium Series

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DATE:

SEPTEMBER 24, 2015

TIME:

12:30PM-1:30PM

(REFRESHMENTS AT 12:15PM)

LOCATION:

OSBORNE CENTER

ROOM# A327

Bäcklund transformations, discrete Painlevé equations, and Sakai's geometric classification scheme

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Abstract: The goal of this talk is to give a brief introduction into the geometric approach of H. Sakai to the theory of discrete (primarily, difference) Painlevé equations. We start with a very brief introduction into the history and applications of Painlevé equations and then we show how discrete Painlevé equations arise from Bäcklund transformations of the usual differential Painlevé equations using some concrete examples. We then explain how to construct, from the resulting difference Painlevé equation, a certain rational algebraic surface that is called the space of the initial conditions (or the Okamoto surface) of the equation. In the process of constructing this surface we will introduce all of the main ingredients that are needed to explain the general classification scheme of H. Sakai for discrete Painlevé equations. In this approach each discrete Painlevé equation corresponds to a particular translation element in the affine Weyl symmetry group acting on the Picard lattice of the Okamoto surface. We will conclude the talk by indicating how to obtain the equation starting from the given translation element of the affine Weyl group.