8th International Conference on Symmetries and Integrability of Difference Equations (SIDE8) **June 22–28, 2008**
8e *Conférence internationale "Symétrie et intégrabilité des équations aux différences"* (SIDE8) **22–28 juin, 2008**

Discrete Koenigs nets

Yuri Suris
Zentrum Mathematik
Technische Universitaet Muenchen
Boltzmannstr. 3
Garching bei Muenchen, Bavaria 85747
GERMANY

suris@ma.tum.de

Abstract

We discuss discretization of Koenigs nets (conjugate nets with equal Laplace invariants) and of isothermic surfaces. Our discretization is based on the notion of dual quadrilaterals: two planar quadrilaterals are called dual, if their corresponding sides are parallel, and their non-corresponding diagonals are parallel. Discrete Koenigs nets are defined as nets with planar quadrilaterals admitting dual nets. Several novel geometric properties of discrete Koenigs nets are found; in particular, two-dimensional discrete Koenigs nets can be characterized by co-planarity of the intersection points of diagonals of elementary quadrilaterals adjacent to any vertex; this characterization is invariant with respect to projective transformations. Discrete isothermic nets are defined as circular Koenigs nets. This is a new geometric characterization of discrete isothermic surfaces introduced previously as circular nets with factorized cross-ratios.