## A geometric solution of the semi-discrete sinh-Gordon equation and applications.

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In the continuous (or smooth) case, it is known that the compatibility condition for constant mean curvature (CMC, for short) surfaces gives the famous integrable equation called the sinh-Gordon equation. On the other hand, any CMC surface can be described by a construction using matrix splitting theorems. This construction is now called the DPW method.

Recently, in order to give a more uniform understanding of integrable systems amongst other reasons, a new research subject called Discrete Differential Geometry has been developed. Discretizing differential geometric objects is of interest amongst integrable systems theorists and differential geometers.

In this talk we first briefly introduce the DPW method for smooth CMC surfaces. After that, we give an overview of a geometric solution of a semi-discrete version of the sinh-Gordon equation. Finally, solutions of the semi-discrete sinh-Gordon equation are introduced. This result provides not only solutions of the semi-discrete sinh-Gordon equation, but also a construction of semi-discrete CMC surfaces in 3-dimensional Riemannian spaceforms.

This talk is based on joint work with Wolfgang Carl (TU Graz).