

Josef Dorfmeister, 57th Texas Topology and Geometry Conference

Texas Tech University, Feb. 17-19, 2017

Title:

Harmonic maps from Riemann surfaces to k -symmetric spaces via loop groups

Abstract:

Harmonic maps between Riemannian manifolds have been investigated intensively for several decades now. A particularly interesting application of harmonic map theory is to surface theory. The classical result, due to Ruh, states that an immersion $f: M \rightarrow R^3$ from a Riemann surface M to R^3 has constant mean curvature if and only if the Gauss map $N: M \rightarrow S^2$ of f is harmonic (relative to the naturally given metrics). It turns out that many surface classes admit a similar characterization, and we will present several examples. An important feature of such surfaces is that they are a member of an S^1 -family of surfaces of the same type. This way one associates with each surface an S^1 -family of harmonic maps. And then one obtains an S^1 -family of framings of the harmonic maps. The fact that the domain is a surface permits a very useful description of the Maurer-Cartan forms of these frames. Thus the discussion centers on a description/construction of all S^1 -families of frames of harmonic maps and is achieved by considering these families as maps into loop groups. As an illustration of these results we will present some concrete applications to surface theory.