1077-53-2863 **Josef F Dorfmeister** (dorfm@ma.tum.edu), Zentrum Mathematik, Technische Universitat Munchen, D-85747, Garching bei Munchen, Germany, and **Ivan C Sterling*** (isterling@smcm.edu), Deparment of Mathematics and Computer Science, 18952 E. Fisher Road, St. Mary's City, MD 20686-3001. *Solutions to the Sine-Gordon Equation of Low Differentiability.* Preliminary report.

There is essentially a one to one correspondence between pseudo-spherical immersions in $\mathbb{R}^3$, Lorentz harmonic maps to S^2 and solutions to the sine-Gordon equation $\omega_{xy} = \sin\omega$. All C^2 solutions to the sine-Gordon equation are given by a loop group factorization process whose input are assume to be C^1. What happens if the input is only C^0? It turns out that one still obtains a C^1 solution to the sine-Gordon equation. That is ω_{xy} and ω_{yx} exist, are equal, and also equal $\sin\omega$.

Hilbert proved that there are no C^2 pseudo-spherical immersions of $\mathbb{R}^2$ into $\mathbb{R}^3$ using basic properties of the sine-Gordon equation. On the other hand Kuiper proved there exist such C^1 immersions, however no examples are known. We will review the loop group constructions, sketch proofs of the claims, hopefully show some graphics and discuss open questions. (Received September 22, 2011)