

Wave maps and constant curvature surfaces: singularities and bifurcations

DAVID BRANDER AND FARID TARI

Abstract. Wave maps (or Lorentzian-harmonic maps) from a $1 + 1$ -dimensional Lorentz space into the 2-sphere are associated to constant negative Gaussian curvature surfaces in Euclidean 3-space via the Gauss map, which is harmonic with respect to the metric induced by the second fundamental form. We give a method for constructing germs of analytic Lorentzian-harmonic maps from their k -jets and use this construction to study the singularities of such maps. We also show how to construct pseudospherical surfaces with prescribed singularities using loop groups. We study the singularities of pseudospherical surfaces and obtain their bifurcations in generic 1-parameter families of such surfaces.

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