Global existence of Dirac-wave maps with curvature term on expanding spacetimes

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The action functional of the supersymmetric nonlinear sigma model is an important model in modern quantum field theory. From a mathematical point of view it consists of a map between two manifolds and a vector spinor defined along that map.

If one chooses a Riemannian domain manifold its critical points couple the elliptic harmonic map equation with the vector spinor, this system became known as Dirac-harmonic maps and variants thereof. Since the action functional of the supersymmetric nonlinear sigma model is unbounded from below it is very difficult to obtain existence results for this system.

However, in the case of a globally hyperbolic domain manifold the critical points lead to the Dirac-wave map system which is a hyperbolic system of partial differential equations. In this setup unbounded action functionals are much better to deal with.

We will present an existence result for wave maps and Dirac-wave maps with curvature term with small initial data on globally hyperbolic manifolds of arbitrary dimension which satisfy a suitable growth condition.

References

[1] V. Branding, K. Kröncke, Global existence of Dirac-wave maps with curvature term on expanding spacetimes *Calculus of Variations and Partial Differential Equations* **57** (2018).