Standing on the shoulders of geometers: the string curved propagation model.

Abstract:

The original sigma-model of Gell-Mann and Levy was a field theory toy model for describing the low-energy interactions of pi-mesons. The interest for geometers arises because it is a theory where the scalar fields take values in a manifold. Moreover, string theorists have in them a playground for the propagation of the string (or brane) on a curved manifold, and in this sense the Wess-Zumino-Witten models were born. Geometrically, these are group manifolds which, by virtue of being parallelisable, serve to fulfil the beta equation for the non-linear sigma model, which when applied to strings contains chiral symmetries. I will discuss how to obtain classes of solutions to chiral, conformally-invariant models using the machinery of three- and four-dimensional Lie groups admitting left-invariant metrics and a left-invariant Wess-Zumino coupling. These are interesting from the point of view of integrable field theories, which however I shall not be talking about, since I do not know anything about the topic.