CLASSICALLY INTEGRABLE TWO-DIMENSIONAL NON-LINEAR SIGMA MODELS

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Abstract. We give a master equation expressing the zero curvature representation of the equations of motion of a two-dimensional non-linear sigma models. The geometrical properties of this equation are highlighted.

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1. Introduction

This note is a summary and a selection of a longer paper which deals with the issue of integrability in two-dimensional non-linear sigma models [14]. The interest in this subject stems from the fact that, in the past, only few of such theories were known to be integrable. These are the principal chiral model [19], the Wess-Zumino-Witten model and their various modifications. However, recently, more studies have been devoted to this problem and more integrable non-linear sigma models have been discovered [1–4, 7, 10–13, 17, 18]. These theories were found by pure guesses or by brute force. The aim of this short contribution is to provide a systematic method for searching for integrable two-dimensional non-linear sigma models. The result of this work is a ‘master equation’ whose solutions yields all the, so far, known integrable non-linear sigma models.