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Report on the BSc Thesis of Lenka Kucerova entitled "Surfaces Associated with Sigma Models"

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This thesis provides a review of recent results concerning two-dimensional smooth orientable surfaces immersed in $su(N)$ Lie algebras. These surfaces are derived from the CP^{N-1} sigma model defined on Minkowski space. In particular, the geometric properties of such surfaces expressed in terms of any regular solution of the CP^1 model are discussed in detail. The description of surfaces on the $su(2)$ algebra associated to the CP^1 model and the connection to the sine-Gordon equation are given. The construction of explicit solutions to this system of equations describing the CP^1 model is obtained from symmetry reduction. A new procedure is proposed in this thesis for constructing elliptic solutions to this system of equations leading to diverse types of surfaces and is illustrated by several examples of such solutions. This result constitutes a new and original contribution and deserves to be published in a journal within the subject. Such an accomplishment required a very good knowledge of elliptic functions and their integrals, as well as theta function analysis. Long and tedious calculations were involved, and the author demonstrated excellent skill in this matter. The thesis is clearly written with very proficient English. I must point out that the level of knowledge and maturity displayed in this work exceeds the requirements of a BSc thesis. Under these circumstances, I strongly recommend the acceptance of this thesis with no corrections and I classify it as excellent.

Sincerely yours,

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