

Continuous symmetries of difference equations

B. F. Nteumagne* and K. S. Govinder

University of Kwazulu-Natal

feuganteu@yahoo.fr

SAMS Subject Classification: Lie Groups and Transformations.

Given an ordinary or partial differential equation, one can apply Lie algebra techniques to analyze the problem. It is commonly known that the number of independent variables can be reduced after the symmetries of the equation are obtained. One can determine the optimal system of the equation in order to get a reduction of the independent variables. We can as well, using the method, obtain new solutions from known ones. This feature is quite interesting because some differential equations have apparently useless trivial solutions, but applying Lie symmetries on them, more interesting solutions are obtained. The question arises when it happens that our equation contains a discrete quantity. In other words, can the same steps be performed when we have a difference equation? How do we find symmetries of difference equations and how do we use them? We perform an analysis on the work done by some researchers in the field and apply their results to some examples.