

# LIE POINT SYMMETRIES OF DIFFERENCE EQUATIONS

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## **Abstract**

A review will be given of an ongoing research program pursued for the last 15 years. Its aim is to turn Lie group theory into an efficient tool for solving difference equations. Algorithms for determining all continuous Lie point symmetries of given difference or differential difference equations will be presented. Continuous symmetries will be applied to classify difference equations on lattices and to obtain explicit exact solutions. Applications to numerical methods will be discussed and examples will be given showing how the account of point symmetries can improve the accuracy and the qualitative features of numerical solutions of differential equations.