

# SYMMETRY PRESERVING DISCRETIZATION OF ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

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## **Abstract**

Given a system of differential equations its Lie point symmetry group  $G$  can be obtained using standard methods. The aim of this approach is to construct a difference scheme (a system of difference equations and a lattice) that are invariant under the same Lie group  $G$ . It will be shown how this can be done using “difference” invariants instead of differential ones. The lattices are not in general regular ones and they transform under the group action. The construction of invariant Lagrangians and a discrete analog of Noether’s theorem will be presented.