GENERALIZED LIE SYMMETRIES OF DIFFERENCE EQUATIONS

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Abstract

Integrable Nonlinear Partial Differential Equations (NPDE), have a Lax representation, Bäcklund transformations and an infinite number of symmetries and conservation laws. Of the symmetries a few are Lie point symmetries but the rest are generalized symmetries. Moreover the existence of generalized symmetries for a given NPDE is an indication of its integrability. The purpose of the course is to explain the discrete counterpart of these facts. More precisely, we will explain how one can construct generalized symmetries for nonlinear differential difference and difference equations by both applying the classical Lie invariance condition and by using its integrability properties. It will be shown how one can extend to the formal symmetry techniques to classify integrable equations in the discrete case