On Sequences of Nonlinear Evolution Equations

by

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Abstract: We give a short introduction to the concept of *symmetry-integrable* evolution equations and propose necessary conditions which determine the nonlinearities of fully-nonlinear symmetry-integrable equations in 1+1 dimensions. We apply those conditions to identify some sequences of equations based on their Lie-Bäcklund and Lie point symmetry properties. In particular we discuss the odd-order fully-nonlinear sequence of evolution equations

$$u_t = \left(u_{(2k+3)x}\right)^{-\frac{k+1}{k+2}} \qquad k = 0, 1, 2, 3, \ldots$$

which was proposed in our paper [1]. We also introduce some new sequences of quasilinear evolution equations and discuss several open problems and their challenges.

Reference:

[1] M. Euler and N. Euler, Two sequences of fully-nonlinear evolution equations and their symmetry properties, *Communications in Nonlinear Mathematical Physics*, onmp:16486, vol. 5, 2025. https://doi.org/10.46298/**ocnmp.16486**