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Towards a classification of evolution equations with Lax pairs over the octonions

The talk reports on a project on classifying integrable polynomial evolutionary equations with operator Lax pairs for an octonion variable. The method uses a scaling ansatz to set up a general polynomial form for the evolution equation and the Lax pair. A condition for linear differential operators to be a Lax pair over octonions is formulated and solved for the unknown coefficients in the polynomials. The talk will also report on computational aspects including improvements of algorithms to solve over-determined non-linear algebraic systems and even corrections of the programming language itself. First results include 3rd and 5th order equations with KdV and mKdV scaling weights.