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11. Mathematical Physics

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Superposition principles for nonlinear partial differential equations in (1+1) dimension

An approach similar to a superposition principle for ODEs is proposed for NPDEs in (1+1) dimension. Such equations associated with truncated Painleve expansions are considered, and the possibility of permutability for the simplest solitary waves and another solution with suitable boundary conditions is shown. The latter before and after an collision can be connected vie a nonparametric transformation in view of its evolution without other perturbations. In the simplest case, the above just results in a phase shift. The MKdV, Burgers, Sawada-Kotera, etc cases were investigated, and two-soliton solutions were constructed.

Reference: A A Alexeyev, A superposition principle for NPDEs, *in preparation* (1998).