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Methods to detect solitons among geophysical signals

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Methods to detect solitons and determine their parameters are considered. The fist simple observational test for the soliton identification is based on the determination of statistical relationships between amplitude, duration, and carrying frequency of the detected signals, and their comparison with relationships predicted by the soliton theory. The second method is based on the solution of the inverse scattering problem for the relevant non-linear equations. As an example the Derivative Non-Linear Schrödinger equation has been considered. The integral reflection coefficient, which should rapidly drops when a signal is close to N-soliton profile, has been suggested as a soliton detector. Application of this technique to numerically simulated signals shows that it is more efficient than standard Fourier transform and can used as a practical tool for the analysis of outputs from non-linear systems.