Some Useful Filtering Techniques for Ill-posed Problems

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Some useful filtering techniques for computing approximate solutions of ill-posed problems are presented. Special attention is given to the role of smoothness of the filters and the choice of time-dependent parameters used in these filtering techniques. Smooth filters and proper choice of time-dependent parameters in these filtering techniques allow numerical construction of more accurate approximate solutions of ill-posed problems. In order to illustrate this and the filtering techniques, a severely ill-posed fourth-order nonlinear wave equation is numerically solved using a three time-level finite difference scheme. Numerical examples are given showing the merits of the filtering techniques.

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