

A splitting approach for the KdV and KP equations

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We consider a splitting approach for the time integration of partial differential equations containing a Burgers-type nonlinearity. Typical examples comprise the Korteweg–de Vries (KdV) and the Kadomtsev–Petviashvili (KP) equation. Whereas the linear part in both equations is efficiently integrated by fast Fourier techniques, the nonlinearity is handled with the method of characteristics.

For the Burgers-type nonlinearity we propose a semi-Lagrangian approach based on polynomial interpolation. It is shown that the necessary interpolation procedure can be efficiently implemented. The error made by our splitting scheme is compared to exponential integrators which have been shown in Klein and Roidot (SIAM J. Sci. Comput., 2011) to perform best for stiff solutions of the KP equation. In addition, the conservation properties of the numerical schemes under consideration are investigated.

The talk is based on the paper *L. Einkemmer and A. Ostermann, A splitting approach for the Kadomtsev–Petviashvili equation*, arXiv:1407.8154 (2014).