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Takayasu Matsuo (talk 6): A new convergence estimate of a energy-preserving scheme for the KdV equation

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In this talk, we consider an energy-preserving finite difference scheme for the KdV equation (Furihata, 1996). The scheme preserves the cubic energy function, and has been empirically known that it works better than (L2)norm-preserving schemes. However, since the cubic energy function by itself is not useful in the mathematical analysis of numerical schemes, the convergence estimate of the scheme has been left open until now (in contrast to the norm-preserving cases, where various results are known.)
Recently, we devised a new convergence estimate argument that successfully gives the desired estimate. The argument is constructed in an inductive way, and can be applied to the cases where useful a priori estimates on the solution (such as in L2 or sup) are hard to obtain. It can be applied to other energy-preserving schemes for the generalized KdV or the Ostrovsky equation.