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In Exact non-reflecting boundary conditions by Keller and Givoli, an exact boundary condition is devised for the numerical solution of the reduced wave equation in an infinite domain, using the finite element method. It permits the computation to be restricted to a small finite region without error. This work has been extended to other equations, incuding those for elastic waves, and small test problems have shown that the method is very effective.

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In *Exact non-reflecting boundary conditions* by Keller and Givoli, an exact boundary condition is devised for the numerical solution of the reduced wave equation in an infinite domain, using the finite element method. It permits the computation to be restricted to a small finite region without error. This work has been extended to other equations, including those for elastic waves, and small test problems have shown that the method is very effective.

In *Nonlinear hyperbolic waves* Hunter and Keller show how to determine the propagation of short nonlinear waves of any strength. The initial phase of the motion is based upon the nonlinear theory for one dimension applied along the normal to the wave. The later motion is governed by weakly nonlinear geometrical optics.

In *Fast reaction, slow diffusion and curve shortening*, Rubinstein, Sternberg and Keller analyze reaction-diffusion systems with small diffusion. They show that fronts develop and that they often propagate with a velocity proportional to their mean curvature. Thus results from differential geometry are applicable to this flow. They also show, in *Reaction-diffusion processes and evolution to harmonic maps*, that these equations lead to diffusion equations with values in a manifold, which converge to harmonic maps of the domain into this manifold.

In *Nonlinear wave motion in a strong potential*, Rubinstein and Keller show that a strong potential can guide a wave along the manifold of rest points of the potential (the mean motion) with small transverse oscillations. The oscillations can alter the mean motion. This result may have application to the equations used by Atiyah, Hitchen and others in the theory of monopole motion.

In *Nonlinear eigenvalue problems under strong localized perturbations, with applications to chemical reactors*, Ward and Keller show how a strong localized perturbation can shift the location of the fold point in a bifurcation diagram. They apply this theory to nonlinear chemical reactors and find how the critical value of the Frank-Kaminetzky parameter is changed by a cooling rod, an insulating patch, etc. Their results contradict and correct previously published work on this topic.

In three papers (*Partition asymptotics from recursion equations, Asymptotic behavior of high order differences of the partition function*, and *Stirling number asymptotics*), Knessl and Keller show how the ray method of wave theory can be used to solve problems of asymptotic behavior in number theory and combinatorics. This method may be useful in the analysis of computer memory and computer network problems.