Time-stepping algorithms for hyperbolic PDEs and conservation laws

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Hyperbolic partial differential equations (PDEs), and especially conservation laws, appear in many important practical situations from computational fluid dynamics to fiber optics. Their solutions often have features such as discontinuities that make their numerical solution challenging. A powerful and popular technique for the numerical solution of these equations is the method of lines, which treats the discretizations in space and time separately. In the traditional method of lines, the spatial dimensions are discretized using finite differences, finite elements, etc. to yield a large set of initial-value problems (IVPs) in time. On the other hand, the transverse method of lines applies a discretization in time to yield a large set of boundary-value problems (BVPs) in space. An appealing property of this approach is that specialized techniques and software can then be used (or developed) to solve the ensuing IVPs or BVPs.

This minisymposium will give a diverse selection of specialized techniques and approaches to the numerical solution of hyperbolic PDEs and conservation laws. The topics range from new theory to new methods to new software.