Geometric integration and absorbing boundary conditions

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This talk is about the confluence of two subjects of the numerical solution of time evolution PDEs: numerical methods that preserve geometric properties of the flow and absorbing boundary conditions to reduce the computation to a finite domain. This confluence is studied with special attention to the time stability of the resulting full discretization. Since geometric methods are not always A-stable, it is necessary a suitable behaviour of the real part of the eigenvalues of the spatially discretized problem to avoid in practice any time instability. We study the case of the one dimensional wave equation discretized with finite differences. Coupled wave equations are also considered.