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SUPG finite element computation of inviscid supersonic flows with $YZ\beta$ shock-capturing.

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Summary: Stabilization and shock-capturing parameters for the streamline-upwind/Petrov-Galerkin (SUPG) formulation of compressible flows based on conservation variables are assessed in test computations with inviscid supersonic flows and different types of finite element meshes. The new shock-capturing parameters, categorized as $YZ\beta$ shock-capturing in this paper, are compared to earlier parameters derived based on the entropy variables. In addition to being much simpler, the new shock-capturing parameters yield better shock quality in the test computations, with more substantial improvements seen for triangular elements.

MSC:

76M10 Finite element methods applied to problems in fluid mechanics
76J20 Supersonic flows

Keywords:

conservation variables; entropy variables; triangular elements

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