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Finite element stabilization parameters computed from element matrices and vectors. (English) Zbl 0973.76057

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Summary: We propose new ways of computing the stabilization parameters used in the stabilized finite element methods such as the streamline-upwind/Petrov-Galerkin and pressure-stabilizing/Petrov-Galerkin formulations. The parameters are computed based on the element-level matrices and vectors, which automatically take into account the local length scales, advection field and the Reynolds number. We describe how we compute these parameters, first in the context of a time-dependent advection-diffusion equation, and then in the context of Navier-Stokes equations for unsteady incompressible flows.

MSC:

76M10 Finite element methods applied to problems in fluid mechanics
76D05 Navier-Stokes equations for incompressible viscous fluids

Keywords:

stabilization parameters; stabilized finite element methods; element-level matrices and vectors; time-dependent advection-diffusion equation; Navier-Stokes equations; unsteady incompressible flows

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