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An adjoint-based design methodology for CFD problems. (English) Zbl 1078.76057
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Summary: A complete CFD design methodology is presented. The main components of this methodology are a general edge-based compressible/incompressible flow solver; a continuous adjoint formulation for the gradient computations; a steepest descent technique for the change of design variables; evaluation of the gradient of the discretized flow equations with respect to mesh by finite differences; a CAD-free pseudo-shell surface parametrization, allowing every point on the surface to be optimized to be used as a design parameter; and a level type scheme for the movement of the interior points. Several examples are included to demonstrate the methodology developed.

MSC:

76M99 Basic methods in fluid mechanics

Cited in 14 Documents

Keywords:

compressible flow, incompressible flow; pseudo-shell surface parametrization; finite element analysis; optimization techniques

Full Text: [DOI](#)

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