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**Computational sensitivity analysis of laminar flows using finite volume methods**<sup>1</sup> RICHARD KIRKMAN, MEREDITH METZGER, University of Utah — Computational sensitivity analysis is an emerging field of research with the potential to improve the efficiency of parameter studies, provide increased insight during optimization processes, and assess the cascade effect of input uncertainty into numerical data. An unsteady finite volume based fractional step computational fluid dynamics algorithm has been developed and coupled with several common computational sensitivity analysis methods (finite difference, continuous sensitivity equation method, and complex step) to generate local sensitivity coefficients. A survey of these computational sensitivity analysis methods has been performed comparing accuracy, computational efficiency, and ease of implementation. Several examples of sensitivity analysis to parameters associated with the governing equations, as well as parameters associated with geometric extent of the domain and boundary conditions, are presented for several laminar flow fields, including developing flow in a two-dimensional channel and boundary layer flow over two staggered cubes.

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