

A Metric-Based Anisotropic Mesh Adaption in CFD

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The effectiveness of anisotropic grids is acknowledged in the numerical modelling of many CFD applications, essentially due to the computational saving in the presence of directional features. The expertise gained in this area over the last years is primarily addressed to mesh adaption strategies driven by suitable error estimators, mainly of a posteriori type. With a view to CFD problems, a crucial role is played by the goal-oriented approach useful to control physically meaningful quantities. In this presentation we review the main ideas of the anisotropic analysis developed moving from Formaggia, Perotto Numer. Math. 2001, and covering so far 2D elliptic problems (both pure diffusive and advective-dominated), as well as Stokes and Navier-Stokes equations, up to the heat equation. The leading feature of our approach is the employment of a proper metric, stemming from the error estimator, to generate the adapted mesh.