

A variational multi-scale anisotropic mesh adaptation scheme for aerothermal problems

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ABSTRACT

We propose a new mesh adaptation technique to solve the thermal problem of the impingement jet cooling. It relies on a subscales error estimator computed with bubble functions to locate and evaluate the PDE-dependent approximation error. Then, a new metric tensor based on the subscales error estimator is suggested for anisotropic mesh adaptation. We combine the coarse scales anisotropic interpolation error indicator [5-7] with the subscales error estimator allowing us to take into account the anisotropic variations of the solution but also the sub-grid information. The results show that the resulting meshes of this parallel adaptive framework [1-4] allow to capture the turbulently generated flow specificities of the impingement jet cooling and in particular, the secondary vortexes [8].

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