Optimal Shape Design with Turbulent flows

Olivier Pironneau
pironneau@ann.jussieu.fr
University of Montpellier II and of Paris VI, France

Optimal shape design of wings, ventilators, engines or others is the next industrial step once the numerical simulation of the flows are in control. The classical methods of calculus of variations for differentiable optimization work but the systems of equations are so complex that many new tools must be developped. We will recall the various theoretical and applied problems and solutions found for k-epsilon Navier-Stokes flows and their domain shape optimizations. This is joint work with B. Mohammadi.