Vortex shedding in flow past an airfoil using boundary layer approximation XINJUN GUO, SHREYAS MANDRE, Brown University — We present an extension of the Kutta condition using matched asymptotic expansion applied to the Navier-Stokes equation. The goal is to study the influence of unsteady fluid dynamical effects like leading edge vortex, unsteady boundary layer separation, etc. in flow around a solid body. In order to describe accurately the location and strength of vortex shedding, we solve the simplified Navier-Stokes equations in the form of boundary layer approximation in the thin inner region close to the solid body. In the outer region far from the structure, the vortex methods are applied, which significantly reduces the computational cost compared to CFD in the whole domain.

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