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Evaluating vortex sheet models for separated flow past a flat plate

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— Numerical studies of separated flows using the full governing equations are computationally expensive. In practice, low order point vortex or vortex sheet models are often used instead. These models are based on simple algorithms to satisfy the Kutta condition at sharp edges. Here, we use highly resolved direct numerical simulations of flow past a finite flat plate to evaluate vortex sheet models for separation. We obtain values for the shed circulation, vortex trajectory and vortex sizes as a function of time and Reynolds number, for accelerated flow past a flat plate at an angle to the incoming flow. We then compare the viscous results with results from a vortex sheet model and determine the extent to which the model reproduces the flow.

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