Remarks on Continuation of Inviscid Vortex Flows in the Presence of the Kutta Condition BARTOSZ PROTAS, Department of Mathematics & Statistics, McMaster University, Canada, FEDERICO GALLIZIO, Dipartimento di Ingegneria Aeronautica e Spaziale, Politecnico di Torino, Italy, ANGELO IOLLO, Institut de Mathematiques de Bordeaux, Universite Bordeaux 1, France, LUCA ZANNETTI, Dipartimento di Ingegneria Aeronautica e Spaziale, Politecnico di Torino, Italy — Our investigation concerns solutions of the steady–state Euler equations in two dimensions featuring finite–area regions with constant vorticity embedded in a potential flow. Using elementary methods of the functional analysis we derive precise conditions under which such solutions can be uniquely continued with respect to their parameters, valid also in the presence of the Kutta condition concerning a fixed separation point. Our approach is based on the Implicit Function Theorem and perturbation equations derived using shape–differentiation methods. These theoretical results are illustrated with careful numerical computations carried out using the Steklov–Poincaré method which show the existence of a global manifold of solutions connecting the point vortex and the Prandtl–Batchelor solution, each of which satisfies the Kutta condition.

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