COMPACTLY SUPPORTED SOLUTIONS TO THE STATIONARY 2D EULER EQUATIONS WITH NONCIRCULAR STREAMLINES

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In this talk we are interested in compactly supported solutions of the steady Euler equations. In 3D the existence of such solutions has been an open problem until the recent result of Gavrilov (2019). In 2D, instead, it is easy to construct solutions via radially symmetric stream functions. Low regularity solutions without radial symmetry have been found in the literature, but even the C^1 case was open. In this talk we construct such solutions with regularity C^k, for any fixed k given. For the proof, we look for stream functions which are solutions to non-autonomous semilinear elliptic equations with non-Lipschitz nonlinearity. In this framework we look for a local bifurcation around a conveniently constructed 1-parameter family of solutions. This is joint work with A. Enciso (ICMAT, Madrid) and Antonio J. Fernández (UAM, Madrid).