

One-dimensional symmetry for the Euler equations and related semilinear elliptic equations

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In this talk, I will discuss one-dimensional symmetry properties for the solutions of some PDEs in dimension 2 and in higher dimensions. I will show that a steady flow of an ideal incompressible fluid with no stagnation point and tangential boundary conditions in a two-dimensional strip is a shear flow. The same conclusion holds for a bounded steady flow in a half-plane and in the whole plane, as well as in other geometric configurations. The proofs are based on the study of the geometric properties of the streamlines of the flow and on one-dimensional symmetry results for the solutions of some semilinear elliptic equations. The talk is based on some joint works with N. Nadirashvili.