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Vortex rings in \mathbb{R}^3 and rearrangements. (English) [Zbl 0991.76012](#)

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Summary: We study the existence of steady axisymmetric vortex rings in ideal fluid. A functional, comprising a linear combination of kinetic energy and impulse, is to be maximized subject to the constraint that a quantity related to vorticity belongs to a set of rearrangements of a given function. Generalized solutions of a quite specific type are shown to exist, arising as extreme points of a convex extended constraint set. In the case when the given function is the indicator of a set of finite measure, we demonstrate the existence of proper maximizers and local maximizers.

MSC:

[76B47](#) Vortex flows for incompressible inviscid fluids

[76M30](#) Variational methods applied to problems in fluid mechanics

[76B03](#) Existence, uniqueness, and regularity theory for incompressible inviscid fluids

Cited in 4 Documents

Keywords:

variational problem; existence of steady axisymmetric vortex rings; ideal fluid; rearrangements; convex extended constraint set; maximizers; local maximizers

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