

**Burton, G. R.**

**Vortex rings in a cylinder and rearrangements.** (English) Zbl 0648.35029  
*J. Differ. Equations* 70, 333-348 (1987).

Let  $\Omega \subset \mathbb{R}^3$  be a cylindrical paper with circular cross section. In cylindrical coordinates, let  $Lu = -(1/r)((1/r)u_r)_r - (1/r^2)u_{zz}$ . Given the distribution function of  $Lu$ , there exists a  $\lambda_0 > 0$  such that for  $0 < \lambda < \lambda_0$  there exists a monotone nonlinearity  $\phi$  and a solution  $u \in W_{loc}^{2,p}(\Omega)$  of the problem  $Lu = \phi(u - \lambda r^2/2)$ . Moreover  $u$  satisfies various natural properties and estimates. This result is based on a previous paper of the author on variational problems over classes of functions with prescribed rearrangement [*Math. Ann.* 276, 225-253 (1987; [Zbl 0592.35049](#))]. Related results have recently been obtained by P. Laurence and E. Stredulinsky.

Reviewer: [B.Kawohl](#)

**MSC:**

[35J20](#) Variational methods for second-order elliptic equations  
[76B47](#) Vortex flows for incompressible inviscid fluids

Cited in **13** Documents

**Keywords:**

[vortex rings](#); [Steiner symmetrization](#); [cylindrical coordinates](#); [distribution function](#); [variational problems](#); [rearrangement](#)

**Full Text:** [DOI](#)

**References:**

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