ANALYSIS MEETS GEOMETRY – ON SOME GEOMETRIC PROPERTIES IN PDEs

GIORGIO POGGESI (THE UNIVERSITY OF WESTERN AUSTRALIA)

Abstract

We consider Alexandrov–type, Serrin–type, and Gidas-Ni-Nirenberg–type symmetry results. We provide approaches to symmetry leading to several benefits and generalizations. The results presented are based on the works listed below.

[1] L. Cavallina, G. Poggesi, T. Yachimura, *Quantitative stability estimates for a two-phase Serrin-type overdetermined problem*, Nonlinear Anal., 222 (2022).

[2] S. Dipierro, G. Poggesi, E. Valdinoci, *Radial symmetry of solutions to anisotropic and weighted diffusion equations with discontinuous nonlinearities*, Calc. Var. Partial Differential Equations, 61(2), 72, 2022.

[3] S. Dipierro, G. Poggesi, E. Valdinoci, *A Serrin-type problem with partial knowledge of the domain*, Nonlinear Anal. 208 (2021).

[4] R. Magnanini and G. Poggesi, *On the stability for Alexandrov's Soap Bubble theorem*, J. Anal. Math., 139(1):179–205, 2019.

[5] R. Magnanini and G. Poggesi, *Serrin's problem and Alexandrov's Soap Bubble Theorem: enhanced stability via integral identities*, Indiana Univ. Math. J. 69 (2020), no. 4, 1181–1205.

[6] R. Magnanini and G. Poggesi, *Nearly optimal stability for Serrin's problem and the Soap Bubble theorem*, Calc. Var. Partial Differential Equations, 59(1):Paper No. 35, 2020.

[7] G. Poggesi, *Radial symmetry for p-harmonic functions in exterior and punctured domains*, Appl. Anal. 98 (2019), no. 10, 1785–1798.

[8] G. Poggesi, *The Soap Bubble Theorem and Serrin's problem: quantitative symmetry*, PhD Thesis, defended on 18 February 2019 at Università di Firenze, preprint (2019) arXiv:1902.08584

[9] G. Ciraolo, S. Dipierro, G. Poggesi, L. Pollastro, E. Valdinoci, *Symmetry and quantitative stability for the parallel surface fractional torsion problem*, submitted, preprint (2021) arXiv:2110.03286.

[10] S. Dipierro, G. Poggesi, J. Thompson, E. Valdinoci, *The role of antisymmetric functions in nonlocal equations*, submitted, preprint (2021) arXiv:2203.11468.

Department of Mathematics and Statistics, University of Western Australia, 35 Stirling Highway, WA6009 Crawley, Australia

Email address: giorgio.poggesi@uwa.edu.au