

## THE STEINER SYMMETRIZATION OF LOG-CONCAVE FUNCTIONS AND ITS APPLICATIONS

YOUJIANG LIN AND GANGSONG LENG

*Abstract.* In this paper, we give a new definition of functional Steiner symmetrizations on log-concave functions. Using the functional Steiner symmetrization, we give a new proof of the classical Prékopa-Leindler inequality on log-concave functions.

*Mathematics subject classification (2010):* 46E30, 52A40.

*Keywords and phrases:* Rearrangements of functions, Steiner symmetrizations, Prékopa-Leindler inequality.

### REFERENCES

- [1] S. ARTSTEIN, B. KLARTAG, V. D. MILMAN, *On the Santalò point of a function and a functional Santalò inequality*, *Mathematika* 54 (2004), 33–48.
- [2] F. BARTHE, *On a reverse form of the Brascamp-Lieb inequality*, *Invent. Math.* 134 (1998), 335–361.
- [3] H. J. BRASCAMP, E. H. LIEB, J. M. LUTTINGER, *A General Rearrangement Inequality for Multiple Integrals*, *J. Funct. Anal.* 17 (1974), 227–237.
- [4] A. BURCHARD, *Steiner symmetrization is continuous in  $W^{1,p}$* , *Geom. Funct. Anal.* 7 (1997), 823–860.
- [5] A. BURCHARD, *A short course on rearrangement inequalities*, available at <http://www.math.utoronto.ca/almut/rearrange.pdf>, 2009.
- [6] A. CIANCHI, N. FUSCO, *Strict monotonicity of functionals under Steiner symmetrization*, in: *Calculus of Variations: Topics from the Mathematical Heritage of E. De Giorgi*, *Quad. Mat.*, vol. 14, Dept. Math., Seconda Univ. Napoli, Caserta, 2004, pp. 187–220.
- [7] A. CIANCHI, N. FUSCO, *Steiner symmetric extremals in Pólya-Szegő type inequalities*, *Adv. Math.* 203 (2006), 673–728.
- [8] M. FORTIER, *Convergence results for rearrangements: Old and new*, M.S. Thesis, University of Toronto, December 2010.
- [9] R. J. GARDNER, *The Brunn-Minkowski inequality*, *Bull. Amer. Math. Soc.* 39 (2002), 355–405.
- [10] G. PISIER, *The volume of Convex Bodies and Banach Space Geometry*, *Cambridge Tracts in Math.* 94, Cambridge University Press, Cambridge, 1989.
- [11] R. SCHNEIDER, *Convex Bodies: The Brunn-Minkowski Theory*, *Encyclopedia Math. Appl.*, vol. 44, Cambridge University Press, Cambridge, 1993.