

THE DUAL ORLICZ–BRUNN–MINKOWSKI INEQUALITY FOR CONCAVE FUNCTIONS

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Abstract. In this paper, we define the Orlicz radial sum and dual Orlicz mixed quermassintegral for concave functions, and then establish the dual Orlicz-Brunn-Minkowski inequality for concave functions.

Mathematics subject classification (2010): 52A40, 52A20.

Keywords and phrases: Star body, Orlicz radial sum, dual Orlicz mixed volume.

REFERENCES

- [1] K. J. BÖRÖCZKY, P. HEGEDŰS, G. ZHU, *On the discrete logarithmic Minkowski problem*, Int. Math. Res. Not., 2006, no. 6, 1807–1838.
- [2] K. J. BÖRÖCZKY, E. LUTWAK, D. YANG, G. ZHANG, *The log-Brunn-Minkowski inequality*, Adv. Math. **231** (2012), 1974–1997.
- [3] K. J. BÖRÖCZKY, E. LUTWAK, D. YANG, G. ZHANG, *The logarithmic Minkowski problem*, J. Amer. Math. Soc. **26** (2013), 831–852.
- [4] F. CHEN, J. ZHOU, C. YANG, *On the reverse Orlicz Busemann-Petty centroid inequality*, Adv. in Appl. Math. **47** (2011), 820–828.
- [5] W. CHEN, *L_p Minkowski problem with not necessarily positive data*, Adv. Math. **201** (2006), 77–89.
- [6] R. J. GARDNER, *The Brunn-Minkowski inequality*, Bull. Amer. Math. Soc. **29** (2002), 355–405.
- [7] R. J. GARDNER, D. HU, W. WEIL, *The Orlicz-Brunn-Minkowski theory: a general framework, additions, and inequalities*, J. Differential Geom. **97** (2014), 427–476.
- [8] R. J. GARDNER, D. HUG, W. WEIL AND D. YE, *The Dual Orlicz-Brunn-Minkowski Theory*, J. Math. Anal. Appl. **430** (2015), 810–829.
- [9] C. HABERL, E. LUTWAK, D. YANG, G. ZHANG, *The even Orlicz Minkowski problem*, Adv. Math. **224** (2010), 2485–2510.
- [10] C. HABERL, F. SCHUSTER, *Asymmetric affine L_p Sobolev inequalities*, J. Funct. Anal. **257** (2009), 641–658.
- [11] C. HABERL, F. SCHUSTER, *General L_p affine isoperimetric inequalities*, J. Differential Geom. **56** (2009), 111–132.
- [12] G. H. HARDY, J. E. LITTLEWOOD AND G. PÓLYA, *Inequalities*, second ed., Cambridge University Press, Cambridge, 1988.
- [13] Q. HUANG, B. HE, *On the Orlicz Minkowski problem for polytopes*, Discrete Comput. Geom. **48** (2012), 281–297.
- [14] H. JIAN, J. LU, X. J. WANG, *Nonuniqueness of solutions to the L_p Minkowski problem*, Adv. Math. **281** (2015), 845–856.
- [15] H. JIAN, J. LU, G. ZHU, *Mirror symmetric solutions to the centro-affine Minkowski problem*, Calc. Var. Partial Differ. Equ. **55** (2016), 1–22.
- [16] A. LI, G. LENG, *A new proof of the Orlicz Busemann-Petty centroid inequality*, Proc. Amer. Math. Soc. **139** (2011), 1473–1481.
- [17] J. LU, X. J. WANG, *Rotationally symmetric solutions to the L_p Minkowski problem*, J. Differential Equations **254** (2013), 983–1005.
- [18] M. LUDWIG, *General affine surface areas*, Adv. Math. **224** (2010), 2346–2360.
- [19] E. LUTWAK, *Dual mixed volumes*, Pac. J. Math. **58** (1975), 531–538.

- [20] E. LUTWAK, *The Brunn-Minkowski-Firey theory II: affine and geominimal surface areas*, Adv. Math. **118** (1996), 244–294.
- [21] E. LUTWAK, D. YANG, G. ZHANG, *A new ellipsoid associated with convex bodies*, Duke Math. J. **104** (2000), 375–390.
- [22] E. LUTWAK, D. YANG, G. ZHANG, *The Cramer-Rao inequalities for star bodies*, Duke Math. J. **112** (2002), 59–81.
- [23] E. LUTWAK, D. YANG, G. ZHANG, *Sharp affine L_p Sobolev inequalities*, J. Differential Geom. **62** (2002), 17–38.
- [24] E. LUTWAK, D. YANG, G. ZHANG, *On the L_p Minkowski problem*, Trans. Amer. Math. Soc. **356** (2004), 4359–4370.
- [25] E. LUTWAK, D. YANG, G. ZHANG, *Orlicz projection bodies*, Adv. Math. **223** (2010), 220–242.
- [26] E. LUTWAK, D. YANG, G. ZHANG, *Orlicz centroid bodies*, J. Differential Geom. **84** (2010), 365–387.
- [27] E. LUTWAK, G. ZHANG, *Blaschke-Santaló inequalities*, J. Differential Geom. **47** (1997), 1–16.
- [28] W. D. WANG, *Inequalities for dual quermassintegrals of the radial p th L_p mean bodies*, J. Inequal. Appl. **252** (2014).
- [29] D. XI, H. JIN, G. LENG, *The Orlicz-Brunn-Minkowski inequality*, Adv. Math. **260** (2014), 350–374.
- [30] G. XIONG, D. ZOU, *Orlicz mixed quermassintegrals*, Sci. China Math. **57** (2014), 2549–2562.
- [31] G. ZHANG, *The affine Sobolev inequality*, J. Differential Geom. **53** (1999), 183–202.
- [32] B. ZHU, J. ZHOU, W. XU, *Dual Orlicz-Brunn-Minkowski theory*, Adv. Math. **264** (2014), 700–725.
- [33] G. ZHU, *The Orlicz centroid inequality for star bodies*, Adv. Appl. Math. **48** (2012), 432–445.
- [34] G. ZHU, *The logarithmic Minkowski problem for polytopes*, Adv. Math. **262** (2014), 909–931.
- [35] G. ZHU, *The centro-affine Minkowski problem for polytopes*, J. Differential Geom. **101** (2015), 159–174.
- [36] D. ZOU, G. XIONG, *Orlicz-John ellipsoids*, Adv. Math. **265** (2014), 132–168.