

ON PROPERTIES FOR m -POLYNOMIALS OF UNIT p -BALLS

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Abstract. In this paper we study properties of ‘weighted’ Steiner polynomials associated to the unit p -balls. We show that the corresponding functional can be bounded just by the last but one relative quermassintegral. Then we give a general asymptotic relation between the roots of Steiner polynomials and the above mentioned polynomials. These properties will be obtained as consequences of more general results for the so called m -polynomials.

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REFERENCES

- [1] E. ARTIN, *The gamma function*, Athena Series: Selected Topics in Mathematics, Holt, Rinehart and Winston, New York-Toronto-London 1964.
- [2] P. M. GRUBER, *Convex and Discrete Geometry*, Springer, Berlin Heidelberg, 2007.
- [3] H. HADWIGER, *Das Wills'sche Funktional*, Monatsh. Math. **79** (1975), 213–221.
- [4] H. HADWIGER, *Gitterpunktanzahl im Simplex und Wills'sche Vermutung*, Math. Ann. **239** (3) (1979), 271–288.
- [5] M. A. HERNÁNDEZ CIFRE, J. YEPES NICOLÁS, *On the roots of the Wills functional*, J. Math. Anal. Appl. **401** (2013), 733–742.
- [6] M. A. HERNÁNDEZ CIFRE, J. YEPES NICOLÁS, *On the roots of generalized Wills μ -polynomials*, Submitted.
- [7] J. KAMPF, *On weighted parallel volumes*, Beiträge Algebra Geom. **50** (2) (2009), 495–519.
- [8] P. MCMULLEN, *Inequalities between intrinsic volumes*, Monatsh. Math. **111** (1) (1991), 47–53.
- [9] G. PISIER, *The volume of convex bodies and Banach space geometry*, Cambridge Tracts in Mathematics, 94, Cambridge University Press, Cambridge, 1989.
- [10] R. SCHNEIDER, *Convex Bodies: The Brunn-Minkowski Theory*, Cambridge University Press, Cambridge, 1993.
- [11] R. A. VITALE, *The Wills functional and Gaussian processes*, Ann. Probab. **24** (4) (1996), 2172–2178.
- [12] R. WEBSTER, *Convexity*, Oxford Science Publications, The Clarendon Press, Oxford University Press, New York, 1994.
- [13] J. M. WILLS, *Zur Gitterpunktanzahl konvexer Mengen*, Elem. Math. **28** (1973), 57–63.
- [14] J. M. WILLS, *Nullstellenverteilung zweier konvexgeometrischer Polynome*, Beiträge Algebra Geom. **29** (1989), 51–59.
- [15] J. M. WILLS, *Minkowski's successive minima and the zeros of a convexity-function*, Monatsh. Math. **109** (2) (1990), 157–164.