

INEQUALITIES FOR THE INCENTER SIMPLICES

MA TONGY, ZHAO LINGZHI AND YUAN JUN

Abstract. Let $I_i (i = 0, 1, 2, \dots, n)$ denote the incenter of facet F_i of an n -dimensional simplex Ω_A and we call $\Omega_I = \text{conv}\{I_0, I_1, \dots, I_n\}$ the incenter simplex of Ω_A . In [3], L. H. Tang and G. S. Leng conjectured

$$V(\Omega_I) \leq \frac{1}{n^n} V(\Omega_A),$$

with equality if and only if Ω_A is a regular simplex. In this paper, we give a positive answer of the conjecture. Further, we improve the condition of the equality holds.

Mathematics subject classification (2000): 52A40, 52A20.

Key words and phrases: tangent points simplex, orthocentric simplex, incenter simplex.

REFERENCES

- [1] Q. J. MAO, Q. R. ZUO, *A geometric inequality of tangency-point simplex*, Mathematics in Practices and Theory, **17**, (4) (1987), 71–75.
- [2] H. M. SU, *An inequality for a simplex*, Bulletin of Maths, **5**, (1985), 43–46.
- [3] L. H. TANG, G. S. LENG, *Two new inequalities for tetrahedron*, Maths Competition, Changsha, Education Press of Hunan, (1994), 88–93.
- [4] L. YANG, J. ZH. ZHANG, *The notation of rank in abstract distance space*, Journal of University of Science and Technology of China, **10**, (4) (1980), 52–65.
- [5] L. YANG, J. ZH. ZHANG, *The geometric proof of a algebra theorem*, Journal of University of Science and Technology of China, **11**, (4) (1981), 45–49.
- [6] L. YANG, J. ZH. ZHANG, *A class of geometric inequalities on finite points*(Chinese), Acta Mat. Sinica, **23**, (5) (1980), 740–749.
- [7] Y. ZHANG, *A conjecture of pedal simplex*, Journal of Systems Sci and Math Sci, **12**, (4) (1992), 371–375.