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ON THE EXTENSION OF THE ERDÖS–MORDELL TYPE INEQUALITIES

B. MALEŠEVIĆ, M. PETROVIĆ, M. OBRADOVIĆ AND B. POPKONSTANTINOVIĆ

Abstract. We discuss the extension of inequality $R_A \geqslant \frac{c}{a} r_b + \frac{b}{a} r_c$ to the plane of triangle $\triangle ABC$. Based on the obtained extension, in regard to all three vertices of the triangle, we get the extension of Erdös-Mordell inequality, and some inequalities of Erdös-Mordell type.

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REFERENCES

[1] C. ALSINA, R. B. NELSEN, *A Visual Proof of the Erdös-Mordell Inequality*, Forum Geom. **7** (2007), 99–102.
[2] C. ALSINA, R. B. NELSEN, *When Less is More: Visualizing Basic Inequalities*, Math. Association of America, Ch. 7 (pp. 93–99.), 2009.
[3] A. AVEZ, *A Short Proof of a Theorem of Erdös and Mordell*, Amer. Math. Monthly **100**, 1 (1993), 60–62.
[4] L. BANKOFF, *An elementary proof of the Erdös-Mordell theorem*, Amer. Math. Monthly **65** (1958), 521.
[5] M. BOMBARDELLI, S. H. WU, *Reverse inequalities of Erdös-Mordell type*, Math. Inequal. Appl. **12**, 2 (2009), 403–411.
[6] O. BOTTEMA, R. Ž. DJORDJEVIĆ, R. R. JANIĆ, D. S. MITRINOVIĆ, P. M. VASIĆ, *Geometric Inequalities*, Wolters-Noordhoff, Groningen 1969.
[7] J. M. CHILD, *Inequalities Connected with a Triangle*, The Math. Gazette **23**, No. 254 (1939), 138–143.
[8] N. DERGIADES, *Signed distances and the Erdös-Mordell inequality*, Forum Geom. **4** (2004), 67–68.
[9] P. ERDÖS, *Problem 3740*, Amer. Math. Monthly **42** (1935), 396.
[10] W. JANOUS, *Further Inequalities of Erdös-Mordell Type*, Forum Geom. **4** (2004), 203–206.
[11] D. K. KAZARINOFF, *A simple proof of the Erdös-Mordell inequality for triangles*, Michigan Mathematical Journal **4** (1957), 97–98.
[12] N. D. KAZARINOFF, *Geometric inequalities*, New Math. Library, Vol. **4**, Yale 1961, (pp. 78–79, 86).
[13] V. KOMORNIK, *A short proof of the Erdös-Mordell theorem*, Amer. Math. Monthly **104** (1997), 57–60.
[14] H. LEE, *Another Proof of the Erdös-Mordell theorem*, Forum Geometricorum **1** (2001), 7–8.
[15] J. LIU, *A Weighted Erdös-Mordell Inequation and Its Application*, Journ. f Luoyang Norm. Univ. **5** (2002), doi: CNKI:SUN:LSZB.0.2002-05-005
[16] J. LIU, ZH.-H. ZHANG, *An Erdös-Mordell Type Inequality on the Triangle*, RGMIA **7** (1), 2004.
[17] J. LIU, *A new proof of the Erdös-Mordell inequality*, International Electronic Journal of Geometry **4**, 2 (2011), 114–119.
[18] J. LIU, *Some new inequalities for an interior point of a triangle*, Journal of Mathematical Inequalities, Volume **6**, Number 2 (2012), 195–204.
[19] Z. LU, *Erdös-Mordell type inequalities*, Elemente der Mathematik **63**, 1 (2008), 23–24.
[20] B. MALEŠEVIĆ, *Erdös theorem in the plane of the triangle*, Proceedinngs of XI and XII Meeting of Mathematical Faculty Students of Yugoslavia 1985, 245–250. (see also [21] (1988), pp. 318–320.)
[21] D. S. MITRINOVIĆ, J. E. PEČARIĆ, V. VOLENEC, *Recent Advances in Geometric Inequalities*, Kluwer Academic Publishers, Dordrecht-Boston-London 1988.
[22] L. J. MORDELL, *Solution of Problem 3740*, Amer. Math. Monthly **44**, 4 (1937), 252–254.

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[23] A. OPPENHEIM, *Some inequalities for a spherical triangle and an internal point*, Pub. Elektrotehn. Fak. Ser. Mat. et Phys., Univ. of Belgrade, No. **203** (1967), 13–16.
[24] V. PAMBUCCIAN, *The Erdös-Mordell inequality is equivalent to non-positive curvature*, Journal of Geometry **88**, (2008), 134–139.
[25] R. A. SATNOIANU, *Erdös-Mordell Type Inequalities in a Triangle*, Amer. Math. Monthly **110**, 8 (2003), 727–729.
[26] G. R. VELDKAMP, *The Erdös-Mordell Inequality*, Nieuw Tijdschr.Wisk **45** (1957/58), 193–196.
[27] J. WARENDORFF: *Erdös-Mordell inequality*, WOLFRAM Demonstraction Project 2012. `http://demonstrations.wolfram.com/TheErdoesMordellInequality/`
[28] Y.-D. WU, *A New Proff of a Weighted Erdös-Mordell Type Inequalities*, Forum Geom. **8** (2008), 163–166.
[29] Y.-D. WU, C.-L. YU, Z.-H. ZHANG, *A Geometric Inequality of the Generalized Erdös-Mordell Type*, J. Inequal. Pure and Appl. Math. **10**, 4 (2009).
[30] Y.-D. WU, L. ZHOU, *Some New Weighted Erdös-Mordell Type Inequalities*, Int. J. Open Problems Compt. Math. **4**, 2 (June 2011).