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THE GEOMETRY OF BLUNDON'S CONFIGURATION

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Abstract. Denote by $\mathcal{T}(R,r)$ the family of triangles inscribed in the circle of center O with the radius R and circumscribed to the circle of center I with the radius r. This defines the Blundon's configuration. The family $\mathcal{T}(R,r)$ contains only two isosceles triangles $A_{\min}B_{\min}C_{\min}$ and $A_{\max}B_{\max}C_{\max}$, which are extremal for Blundon's inequalites (1). Some properties of Blundon's configuration are given Section 2. Applications are presented in the last section where a strong version of Blundon's inequalites is obtained (Theorem 7).

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REFERENCES

[1] T. ANDREESCU, D. ANDRICA, *Complex Number from A to..Z*, Second Edition, Birkhäuser, 2014.
[2] D. ANDRICA, C. BARBU, *A geometric proof of Blundon's Inequalities*, Math. Inequal. Appl., **15** 2(2012), 361–370.
[3] D. ANDRICA, C. BARBU, N. MINCULETE, *A geometric way to generate Blundon type inequalities*, Acta Universitatis Apulensis, **31** (2012), 93–106.
[4] D. ANDRICA, C. BARBU, L. PIŞCORAN, *The geometric proof to a sharp version of Blundon's inequalities*, J. Mathematical Inequalities, **10** 4(2016), 1037–1043.
[5] D. ANDRICA, K. L. NGUYEN, *A note on the Nagel and Gergonne points*, Creative Math.and Inf., **17** (2008), 127–136.
[6] T. BIRSAN, *Bounds for elements of a triangle expressed by $R,r,$ and s*, Forum Geometricorum, **15** (2015), 99–103.
[7] W. J. BLUNDON, *Inequalities associated with the triangle*, Canad. Math. Bull., **8** (1965), 615–626.
[8] G. DOSPINESCU, M. LASCU, C. POHOAŢĂ, M. TETIVA, *An elementary proof of Blundon's inequality*, J. Inequal. Pure Appl. Math., **9** (2008), A 100.
[9] D. S. MITRINOVIĆ, J. E. PEČARIĆ, V. VOLENEC, *Recent Advances in Geometric Inequalities*, Kluwer Acad. Publ., Amsterdam, 1989.
[10] C. P. NICULESCU, *A new look at Newton's inequality*, J. Inequal. Pure Appl. Math., **1** (2000), A 17.
[11] C. P. NICULESCU, *On the algebraic character of Blundon's inequality*, Inequality Theory and Applications, Edited by Y. J. Cho, S. S. Dragomir, J. Kim, Vol. 3, Nova Science Publishers, New York, 2003. 139–144.
[12] M. RADIC, *Extreme areas of triangles in Poncelet's closure theorem*, Forum Geometricorum, **4** (2004), 23–26.
[13] R. A. SATNOIANU, *General power inequalities between the sides and the circumscribed and inscribed radii related to the fundamental triangle inequality*, Math. Inequal. Appl., **5**4 (2002), 745–751.
[14] S-H. WU, Y-M. CHU, *Geometric interpretation of Blundon's inequality and Ciamberlini's inequality*, Journal of Inequalities and Applications, (2014), 2014: 381.
[15] S. WU, *A sharpened version of the fundamental triangle inequality*, Math. Inequalities Appl., **11** 3(2008), 477–482.

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