GENERAL POWER INEQUALITIES BETWEEN THE SIDES AND THE CIRCUMSCRIBED AND INSCRIBED RADII RELATED TO THE FUNDAMENTAL TRIANGLE INEQUALITY

RAZVAN ALIN SATNOIANU

Abstract. In this paper we establish the following general triangle inequality between the lengths of its sides $\alpha, \beta, \gamma$, and the circumscribed and inscribed radii $R$ and $r$, respectively:

$$\alpha^n + \beta^n + \gamma^n \leq 2^{n+1}R^n + 2^n\left(3^{1+\frac{n}{2}} - 2^n\right)r^n \quad \text{for any } n \geq 0.$$ 

This result extends to the general case the results previously known for $n = 1, 2$ established by W. Blundon [2,3]. Our inequality also extends the fundamental triangle inequality.


Key words and phrases: geometric triangle inequalities, fundamental triangle inequality, principle of the isosceles triangle.

REFERENCES