ROMANIAN MATHEMATICAL MAGAZINE

In ΔABC the following relationship holds:

$$\sum \sqrt{\cot A}.\sin A \le \frac{3}{4}\frac{R}{r}\sqrt[4]{3}$$

Proposed by Kostantinos Geronikolas-Greece

Solution by Tapas Das-India

$$\sum \sqrt{\cot A}.\sin A = \sum \sqrt{\cos A}.\sqrt{\sin A} \overset{CBS}{\le} \sqrt{\left(\sum \cos A\right)\left(\sum \sin A\right)} =$$

$$= \sqrt{\left(1+\frac{r}{R}\right)\frac{s}{R}} \overset{Euler\ \&\ Mitrinovic}{\le} \sqrt{\left(1+\frac{1}{2}\right)\frac{\frac{3\sqrt{3}R}{2}}{R}} = \frac{3}{2}\sqrt[4]{3} =$$

$$= \frac{3}{2}\sqrt[4]{3}\cdot\frac{R}{R} \overset{Euler}{\le} \frac{3}{2}\sqrt[4]{3}\cdot\frac{R}{2r} = \frac{3}{4}\cdot\frac{R}{r}\sqrt[4]{3}$$

Equality holds for an equilateral triangle