ROMANIAN MATHEMATICAL MAGAZINE

In ΔABC the following relationship holds:

$$\sum_{cyc}\frac{rr_a}{b^2+c^2}\le\frac{2R-r}{8r}$$

Proposed by Kostantinos Geronikolas-Greece

Solution by Mirsadix Muzefferov-Azerbaijan

$$\sum_{cyc}\frac{rr_a}{b^2+c^2}\overbrace{\le}^{A-G}\sum_{cyc}\frac{rr_a}{2bc}=\frac{r}{2}\sum_{cyc}\frac{r_a}{bc}=\frac{r}{2}.\frac{a.r_a+b.r_b+c.r_c}{abc}=$$

$$=\frac{2s(2R-r)}{4RF}.\frac{r}{2}=\frac{2(2R-r)}{4Rsr}.\frac{r}{2}=\frac{(2R-r)}{4R}^{R\ge 2r}\overbrace{\le}^{(Euler)}\frac{2R-r}{8r}$$

$$Equality\ \ holds\ if:\ a=b=c.$$