

ROMANIAN MATHEMATICAL MAGAZINE

In $\triangle ABC$ the following relationship holds:

$$w_a^2 + w_b^2 + w_c^2 \leq \frac{27R^2}{4}$$

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$$\begin{aligned} w_a^2 + w_b^2 + w_c^2 &= \sum_{cyc} w_a^2 \leq \sum_{cyc} s(s-a) = s \left(\sum_{cyc} s - \sum_{cyc} a \right) = \\ &= s(3s - 2s) = s^2 \stackrel{MITRINOVIC}{\leq} \left(\frac{3\sqrt{3}R}{2} \right)^2 = \frac{27R^2}{4} \end{aligned}$$

Equality holds for an equilateral triangle.