ROMANIAN MATHEMATICAL MAGAZINE

**In $\Delta ABC$ the following relationship holds:**

$$\sqrt{a\sin A}+\sqrt{b\sin B}+\sqrt{c\sin C}\le\frac{3\sqrt{6R}}{2}$$

*Proposed by Nguyen Hung Cuong – Vietnam*

*Solution by Daniel Sitaru – Romania*

$$\sqrt{a\sin A}+\sqrt{b\sin B}+\sqrt{c\sin C}=\sum_{cyc}\sqrt{a\sin A}=$$

$$=\sum_{cyc}\sqrt{a\cdot\frac{a}{2R}}=\sum_{cyc}\frac{a}{\sqrt{2R}}=\frac{2s}{\sqrt{2R}}=\frac{s\sqrt{2}}{\sqrt{R}}$$

**Remains to prove:**

$$\frac{s\sqrt{2}}{\sqrt{R}}\le\frac{3\sqrt{6R}}{2}\Leftrightarrow\frac{2s^2}{R}\le\frac{9\cdot 6R}{4}$$

$$8s^2\le 54R^2\Leftrightarrow s^2\le\frac{27R^2}{4}\Leftrightarrow s\le\frac{3\sqrt{3}R}{2}\quad\text{(MITRINOVIC)}$$

Equality holds for $a=b=c$.