

ROMANIAN MATHEMATICAL MAGAZINE

In $\triangle ABC$ the following relationship holds:

$$\sum_{cyc} w_a (\sin A - \sin B) \leq 0$$

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$$\text{WLOG: } a \leq b \leq c \Rightarrow \begin{cases} w_a \geq w_b \geq w_c \\ \sin A \leq \sin B \leq \sin C \end{cases}$$

By rearrangements' inequality:

$$w_a \sin A + w_b \sin B + w_c \sin C \leq w_a \sin B + w_b \sin C + w_c \sin A$$

$$w_a (\sin A - \sin B) + w_b (\sin B - \sin C) + w_c (\sin C - \sin A) \leq 0$$

$$\sum_{cyc} w_a (\sin A - \sin B) \leq 0$$

Equality holds for $a = b = c$.