

PP34344

MIHÁLY BENCZE - ROMANIA

If $a, b, c > 0$ then:

$$\sum_{cyc} (1 + a^2)(1 + b^2) \geq \sum_{cyc} (1 + a^2)(b + c)$$

Solution by Daniel Sitaru.

$$(b - 1)^2 + (c - 1)^2 \geq 0$$

$$b^2 + c^2 + 1 + 1 \geq 2(b + c)$$

$$\frac{(1 + b^2) + (1 + c^2)}{2} \geq b + c$$

$$(1) \quad \frac{(1 + a^2)(1 + b^2) + (1 + a^2)(1 + c^2)}{2} \geq (1 + a^2)(b + c)$$

Analogous:

$$(2) \quad \frac{(1 + b^2)(1 + c^2) + (1 + b^2)(1 + a^2)}{2} \geq (1 + b^2)(c + a)$$

$$(3) \quad \frac{(1 + c^2)(1 + a^2) + (1 + c^2)(1 + b^2)}{2} \geq (1 + c^2)(a + b)$$

By adding (1); (2); (3):

$$\sum_{cyc} (1 + a^2)(1 + b^2) \geq \sum_{cyc} (1 + a^2)(b + c)$$

□

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