

# ROMANIAN MATHEMATICAL MAGAZINE

If  $a, b, c > 0$ ,  $a^2 + b^2 + c^2 = 3$ ,  $\lambda \geq 0$  then:

$$\sum \frac{1}{a^2 + \lambda a + \lambda} \geq \frac{3}{2\lambda + 1}$$

*Proposed by Marin Chirciu-Romania*

*Solution by Tapas Das-India*

$$a^2 + b^2 + c^2 = 3 \text{ or } \frac{(a + b + c)^2}{3} \leq 3 \text{ (CBS) or } (a + b + c) \leq 3 \quad (1)$$

$$\begin{aligned} \sum \frac{1}{a^2 + \lambda a + \lambda} &\stackrel{\text{Bergstrom}}{\geq} \frac{(1 + 1 + 1)^2}{(\sum a^2) + \lambda(a + b + c) + 3\lambda} \stackrel{(1) \& a^2 + b^2 + c^2 = 3}{\geq} \\ &\geq \frac{9}{3 + 3\lambda + 3\lambda} = \frac{3}{2\lambda + 1} \end{aligned}$$

*Equality holds for  $a = b = c = 1$*