ROMANIAN MATHEMATICAL MAGAZINE

If $a,b,c>0, a+b+c=3$ then:

$$\sum\frac{a^{n+1}+b^n+c}{a^{n+2}+b^{n+1}+c^2}\le 3\ , n\in N$$

*Proposed by Marin Chirciu-Romania*

*Solution by Tapas Das-India*

$$a^{n+2}+b^{n+1}+c^2=a^{n+1}.a+b^n.b+c.c\overset{Chebyshev}{\ge}\frac{1}{3}(a+b+c)(a^{n+1}+b^n+c)$$

$$\sum\frac{a^{n+1}+b^n+c}{a^{n+2}+b^{n+1}+c^2}\le\sum\frac{a^{n+1}+b^n+c}{\frac{1}{3}(a+b+c)(a^{n+1}+b^n+c)}=3\sum\frac{1}{a+b+c}\overset{a+b+c=3}{=}3$$

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