ROMANIAN MATHEMATICAL MAGAZINE

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

$$\frac{a+b}{c+d+e}+\frac{b+c}{d+e+a}+\frac{d+c}{b+e+a}+\frac{d+e}{a+b+c}+\frac{e+a}{d+b+c}\geq\frac{10}{3}$$

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Solution by Mirsadix Muzefferov-Azerbaijan

$$\frac{a+b}{c+d+e}+\frac{b+c}{d+e+a}+\frac{d+c}{b+e+a}+\frac{d+e}{a+b+c}+\frac{e+a}{d+b+c}=$$

$$=\left(1+\frac{a+b}{c+d+e}\right)+\left(1+\frac{b+c}{d+e+a}\right)+\left(1+\frac{d+c}{b+e+a}\right)+$$

$$+\left(1+\frac{d+e}{a+b+c}\right)+\left(1+\frac{e+a}{d+b+c}\right)-5=$$

$$=(a+b+c+d+e)\left(\frac{1}{c+d+e}+\frac{1}{d+e+a}+\frac{1}{b+e+a}+\frac{1}{a+b+c}+\frac{1}{d+b+c}\right)-5\overset{Bergstrom}{\geq}$$

$$\geq(a+b+c+d+e).\frac{(1+1+1+1+1)^2}{3(a+b+c+d+e)}-5=\frac{25}{3}-5=\frac{10}{3}$$

$$Equality\ \ holds\ \ for: a=b=c=d=e.$$