

Let n be a positive integer. Also let a_1, a_2, \dots, a_n and b_1, b_2, \dots, b_n be real numbers such that $a_i + b_i > 0$ for $i = 1, 2, \dots, n$. Prove that

$$\sum_{i=1}^n \frac{a_i b_i - b_i^2}{a_i + b_i} \leq \frac{\sum_{i=1}^n a_i \cdot \sum_{i=1}^n b_i - \left(\sum_{i=1}^n b_i \right)^2}{\sum_{i=1}^n (a_i + b_i)}.$$