

Let (x_1, x_2, \dots) be a sequence of positive real numbers satisfying $\sum_{n=1}^{\infty} \frac{x_n}{2n-1} = 1$. Prove that

$$\sum_{k=1}^{\infty} \sum_{n=1}^k \frac{x_n}{k^2} \leq 2.$$