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## On a strengthened Hardy-Hilbert inequality

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**Abstract:** In this paper, a new inequality for the weight coefficient  $W(n, r)$  of the form

$$W(n, r) = \sum_{m=0}^{\infty} \frac{1}{m+n+1} \left( \frac{n+\frac{1}{2}}{m+\frac{1}{2}} \right)^{\frac{1}{r}}$$

$$< \frac{\pi}{\sin\left(\frac{\pi}{r}\right)} - \frac{1}{13(n+1)(2n+1)^{1-\frac{1}{r}}}$$

for  $r > 1$ ,  $n \in N_0 = N \cup \{0\}$  is proved. This is followed by a strengthened version of the more accurate Hardy-Hilbert inequality.

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