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An Extended Hardy-Hilbert Inequality and Its Applications

Authors: [Weijian Jia](#), [Mingzhe Gao](#),

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Abstract: In this paper, it is shown that an extended Hardy-Hilbert's integral inequality with weights can be established by introducing a power-exponent function of the form ax^{-1+x} ($a > 0, x \in [0, +\infty)$), and the coefficient

$$\frac{\pi}{(a)^{1/q}(b)^{1/p} \sin \pi/p}$$

is shown to be the best possible constant in the inequality. In particular, for the case $p = 2$, some extensions on the classical Hilbert's integral inequality are obtained. As applications, generalizations of Hardy-Littlewood's integral inequality are given.



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