Hardy's inequalities with non-doubling weights and sharp remainders.

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Received November 25, 2021,Revised February 19, 2022

ABSTRACT. In the present paper we shall establish N-dimensional Hardy's inequalities with non-doubling weight functions of the distance $\delta(x)$ to the boundary $\partial\Omega$, where Ω is a C^2 class bounded domain of $\mathbf{R}^N$ $(N \geq 1)$. This work is essentially based on one dimensional weighted Hardy's inequalities with one-sided boundary condition and sharp remainders. As weights we admit rather general ones that may vanish or blow up in infinite order such as $e^{-1/t}$ or $e^{1/t}$ at $t = 0$ in one-dimensional case. [1]