

**On general Caffarelli-Kohn-Nirenberg type inequalities
involving non-doubling weights**

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ABSTRACT. By using $W(\mathbf{R}_+) = P(\mathbf{R}_+) \cup Q(\mathbf{R}_+)$ as a class of weight functions, we will establish the Caffarelli-Kohn-Nirenberg type inequalities with non-doubling weights being permitted. The classical Caffarelli-Kohn-Nirenberg type inequalities are categorized into non-critical and critical cases, and it is known that there is some kind of mysterious relationship between them. Interestingly the new framework in this treatise allows them to be integrated and reveals the meaning of mysterious relationships. *