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*The space  $JN_p$*

In 1961, John and Nirenberg introduced the space of *BMO* functions and proved that every *BMO* function has exponentially decaying distribution function. In the same paper, they also introduced another space of functions that we call the John-Nirenberg space with exponent  $p$  and write  $JN_p$ . A function  $u \in L^1_{loc}(Q_0)$  is in  $JN_p(Q_0)$  if

$$\sup \sum_i |Q_i| \left( \int_{Q_i} |u - u_{Q_i}| dx \right)^p < K^p$$

for some  $K < \infty$ , where the supremum is taken over all collections of pairwise disjoint cubes  $Q_i$  in  $Q_0$ .

In this talk, we will discuss what is known about this function space and what kind of functions belong to it. It is known that  $L^p \subset JN_p \subsetneq L^{p,\infty}$ . We will provide an example of a function that is in  $JN_p \setminus L^p$ , even though every monotone  $JN_p$ -function is in  $L^p$ .