报告题目: Estimating high order derivatives of a function through geometry and topology of its zero set

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报告摘要:
We study a very special setting of the Whitney smooth extension problem: for a given closed subset Z in the ball $B^n$, we consider normalized $(d+1)$-smooth functions $f$ on $B^n$, vanishing on $Z$, and ask for the minimal possible norm $||f^{(d+1)}||$ of their last derivative. We discuss some recent results in this direction, which use as an input the “density” of $Z$, or, in contrast, its topology. In particular, the role of the density of $Z$ is analyzed via Remez-type inequalities, on one side, and via restriction to smooth curves, on the other side.

In order to incorporate topological information on $Z$, we use, in particular, some recent results of Lerario and Stecconi, comparing topology of smooth transversal singularities, and of their polynomial approximations. If time allows, we plan also to present the lower bounds on the minimal possible norm $||f^{(d+1)}||$, given the set of critical values of $f$. 