NOTES FOR ANALYSIS AND PDES

Based on the Math 719(Cole)/720(M.Ifrim), Folland and etc.

Author
Wells Guan

Contents

1 Sobolev Spaces

1.1 Sobolev Spaces

Definiton 1.1.1. Denote $\mathcal{D}(U)$ to be the test functions. Let $u \in \mathcal{D}'(U)$, where $U \subset \mathbb{R}^d$ is open. The k-th order L^p-based Sobolev norm of u is

$$||u||_{W^{k,p}(U)} := \sum_{|\alpha| \leq k} ||D^\alpha u||_{L^p}, \quad 1 \leq p < \infty$$

where we are using the distributional derivative and assume that $D^\alpha u$ is an L^p function.