

We study the properties of Sobolev functions and mappings, especially we study the violation of some properties. In the first part we study the Sobolev Embedding Theorem that guarantees $W^{1,p}(\Omega) \subset L^{p^*}(\Omega)$ for some parameter $p^*(p, n, \Omega)$. We show that for a general domain this relation does not have to be smooth as a function of p and not even continuous and we give the example of the domain in question. In the second part we study the Cesari's counterexample of the continuous mapping in $W^{1,n}([-1, 1]^n, \mathbf{R}^n)$ violating Lusin (N) condition. We show that this example can be constructed as a gradient mapping. In the third part we generalize the Cesari's counterexample and Ponomarev's counterexample for the higher derivative Sobolev spaces $W^{k,p}(\Omega, \mathbf{R}^n)$ and characterize the validity of the Lusin (N) condition in dependence on the parameters k and p and dimension.