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Multiplication in Sobolev Spaces.

We will review some of the classical pointwise multiplication theorems in Sobolev-Slobodeckij spaces, and along the way we discuss a counterexample that illustrates how certain multiplication theorems fail in Sobolev-Slobodeckij spaces when a bounded domain is replaced by \mathbb{R}^n . We identify the source of the failure, and examine why the same failure is not encountered in Bessel potential spaces. We will also mention a particularly important variation of one of the multiplication theorems that is relevant to the study of nonlinear PDE systems arising in general relativity and other areas. (Received September 26, 2017)