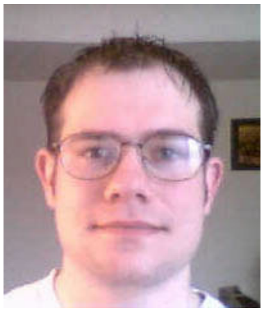

Geoff DIESTEL (geoff_diestel@hotmail.com), Mathematics Department, 202 Mathematical Sciences Building, University of Missouri, Columbia, MO 65211, USA ***Sobolev Spaces with Trivial Isometries.***

ABSTRACT. For a bounded domain $E \subset \mathbb{R}^n$, $p > 0$ and $k \in \mathbb{N}$ we consider the Sobolev space $W_p^k(E)$ of k-times continuously differentiable real-valued functions f on E equipped with the norm

$$\|f\|^p = \|f\|^p_{L_p(E)} + \sum_{1 \le |\alpha| \le k} \|D^\alpha f\|^p_{L_p(E)},$$

where $D^\alpha f = \frac{\partial^{|\alpha|} f}{\partial x_1^{\alpha_1} \ldots \partial x_n^{\alpha_n}}$ and $|\alpha| = \sum_{j=1}^n \alpha_j$ for multiindices $\alpha = (\alpha_1, .., \alpha_n)$ and $\alpha_j \in \mathbb{N} \cup \{0\}$ for $1 \le j \le n$. In this note we show that if p is not an even integer then the structure of linear (surjective) isometries of the spaces $W_p^k(E)$ strongly depends on the geometry of the domain E. We prove the following. Let E and G be closed bounded connected domains in $\mathbb{R}^{\ltimes}$ such that $m(E \setminus int(E)) = 0$. Let $p > 0$, $p \notin 2\mathbb{N}$ and $k \in \mathbb{N}$. Then the space $W_p^k(E)$ is isometric to $W_p^k(G)$ if and only if the domains E and G coincide up to the composition of a translation and a sign-changing permutation of coordinates.