

# Almost sharp descriptions of traces of Sobolev $W_p^1(\mathbb{R}^n)$ -spaces to arbitrary compact subsets of $\mathbb{R}^n$ . The case $p \in (1, n]$

ALEXANDER I. TYULENEV

**Abstract.** Let  $S \subset \mathbb{R}^n$  be an arbitrary nonempty compact set such that the  $d$ -Hausdorff content  $\mathcal{H}_\infty^d(S)$  is strictly positive for some  $d \in (0, n]$ . For each  $p \in (\max\{1, n-d\}, n]$ , an almost sharp intrinsic description of the trace space  $W_p^1(\mathbb{R}^n)|_S$  of the Sobolev space  $W_p^1(\mathbb{R}^n)$  to the set  $S$  is obtained. Furthermore, for each  $p \in (\max\{1, n-d\}, n]$  and  $\varepsilon \in (0, \min\{p-(n-d), p-1\})$ , new bounded linear extension operators from the trace space  $W_p^1(\mathbb{R}^n)|_S$  into the space  $W_{p-\varepsilon}^1(\mathbb{R}^n)$  are constructed.

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