

## Domains of pseudo-differential operators: a case for the Triebel–Lizorkin spaces

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**Abstract.** The main result is that every pseudo-differential operator of type 1, 1 and order  $d$  is continuous from the Triebel–Lizorkin space  $F_{p,1}^d$  to  $L_p$ ,  $1 \leq p < \infty$ , and that this is optimal within the Besov and Triebel–Lizorkin scales. The proof also leads to the known continuity for  $s > d$ , while for all real  $s$  the sufficiency of Hörmander’s condition on the twisted diagonal is carried over to the Besov and Triebel–Lizorkin framework. To obtain this, type 1, 1-operators are extended to distributions with compact spectrum, and Fourier transformed operators of this type are on such distributions proved to satisfy a support rule, generalising the rule for convolutions. Thereby the use of reduced symbols, as introduced by Coifman and Meyer, is replaced by direct application of the paradifferential methods. A few flaws in the literature have been detected and corrected.

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