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Function spaces of variable smoothness and integrability

We present 2-microlocal function spaces of variable integrability in the scales of Besov and Triebel-Lizorkin spaces. Furthermore, we present characterizations of these spaces by atoms and wavelets. These spaces are well adapted to measure local smoothness of functions. This approach contains as a special case the spaces of variable smoothness and integrability which were recently developed by Diening, Hästö and Roudenko motivated by trace theorems.