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authors	• Butzer, P. • Schmeisser, G. • Stens, R.	• Paul L. Butzer • Gerhard Schmeisser • Rudolf L. Stens
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abstract		The purpose of this investigation is to extend basic equations and inequalities which hold for functions \$f\$ in a Bernstein space \$B_\sigma^2\$ to larger spaces by adding a remainder term which involves the distance of \$f\$ from \$B_\sigma^2\$. First we present a modification of the classical modulation space \$M^{2,1}(\mathbb{R})\$, the so-called readapted modulation space \$M^{2,1}_\text{a}(\mathbb{R})\$. Our approach to the latter space and its role in functional analysis is novel. In fact, we establish several chains of inclusion relations between \$M^{2,1}_\text{a}(\mathbb{R})\$ and the more common Lipschitz and Sobolev spaces, including Sobolev spaces of fractional order. Next we introduce an appropriate metric for describing the distance of a function belonging to one of the latter spaces from a Bernstein space. It will be used for estimating remainders and studying rates of convergence. In the main part, we present the desired extensions. Our applications include the classical Whittaker-Kotel'nikov-Shannon sampling formula, the reproducing kernel formula, the Parseval decomposition formula, Bernstein's inequality for derivatives, and Nikol'ski\u{\i}'s inequality estimating the \$l^p(\mathbb{Z})\$ norm in terms of the \$L^p(\mathbb{R})\$ norm.
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