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On convergence properties for a class of Mellin-type convolution operators

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In [4] P.L. Butzer and S. Jansche developed a deep theory about the Mellin transform, including as an important part, the approximation properties of (linear) Mellin convolution integral operators. In more recent years we studied the pointwise convergence of nonlinear Mellin-type convolution operators defined by

$$(T_w f)(s) = \int_0^{+\infty} K_w(ts^{-1}, f(t))\frac{dt}{t},$$

where $s \in I\!R^+$ and $(K_w(t,u))_{w>0}$ is a kernel satisfying some generalized Lipschitz condition, using some kind of singularity assumptions, which was firstly introduced by Julian Musielak and then developed in the book [3]. In particular in [1] we study pointwise convergence at the Lebesgue points of a function f and in [2] we obtain some kind of Voronovskaya formulae in case of local regularity of the function f.

[1] C. BARDARO and I. MANTELLINI, Pointwise convergence theorems for nonlinear Mellin Int. J. Pure Appl. Math, (2006).
[2] C. BARDARO - I. MANTELLINI, Voronovskaya type estimates for Mellin convolution operators", submitted.
[3] C. BARDARO, J. MUSIELAK and G. VINTI, *Nonlinear integral operators and applications*, De Gruyter Series in Nonlinear Analysis and Appl., Vol.9, W. De Gruyter, Berlin, New York, 2003.
[4] P.L. BUTZER - S.JANSCHE, A direct approach to the Mellin Transform, J. Fourier Anal. Appl. **3**, (1997), 325-375.