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ON INTEGRAL LEBESGUE CONSTANTS OF LOCAL SPLINES WITH UNIFORM KNOTS

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We study the stability properties of generalized local splines of the form

$$S(x) = S(f,x) = \sum_{j\in\mathbb{Z}} y_j B_\varphi\Big(x + \frac{3h}{2} - jh\Big) \quad (x \in \mathbb{R}),$$

where $\varphi \in C^1[-h,h]$ for $h > 0$, $\varphi(0) = \varphi'(0) = 0$, $\varphi(-x) = \varphi(x)$ for $x \in [0;h]$, $\varphi(x)$ is nondecreasing on $[0;h]$, f is an arbitrary function from $\mathbb{R}$ to $\mathbb{R}$, $y_j = f(jh)$ for $j \in \mathbb{Z}$, and

$$B_\varphi(x) = m(h)\begin{cases} \varphi(x), & x \in [0;h], \\ 2\varphi(h) - \varphi(x-h) - \varphi(2h-x), & x \in [h;2h], \\ \varphi(3h-x), & x \in [2h;3h], \\ 0, & x \notin [0;3h] \end{cases}$$

with $m(h) > 0$. Such splines were constructed by the author earlier. In the present paper we calculate the exact values of their integral Lebesgue constants (the norms of linear operators from l to L) on the axis $\mathbb{R}$ and on any segment of the axis for a certain choice of the boundary conditions and the normalizing factor $m(h)$ of the spline S.

Keywords: Lebesgue constants, local splines, boundary conditions.

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