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Buslaev, A. P. (RS-MADI)

Bernstein-Nikol’skiĭ inequalities and widths of Sobolev classes of functions. (Russian)

Let $W^r_p(\Gamma_i)$ $(1 < p < \infty; \ r = 1, 2, \ldots; \ i = 0, 1)$ be the Sobolev class of functions $x$ in $L_p([0, 1])$ with $\|x^{(r)}\|_{L_p([0, 1])} \leq 1$ having boundary values $x(i) = \cdots = x^{(r-1)}(i) = 0$. It is proved that the $n$th Bernstein width of the class $W^r_p(\Gamma_i)$ in the metric of $L_q([0, 1])$, where $1 < p < q < \infty$, can be calculated in terms of the spectrum of a related ordinary differential operator. Corresponding results are known (A. Pinkus and the author) in the case $1 < q \leq p < \infty$. The problem is partly reduced to the determination of best constants in associated Bernstein-Nikol’skiĭ inequalities.

Reviewed by *Hans-Jürgen Schmeisser*

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