UDC 519.651

MATEMATICHESKIE TRUDY
2002, V. 5, N 1, 66–73

ON ASYMPTOTICS OF THE JUMP OF HIGHEST DERIVATIVE FOR A POLYNOMIAL SPLINE

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In this article, we obtain $2[n/2]+2$ terms $\big([\cdot]$ stands for the integer part$\big)$ of the asymptotic expansion of the error

$$\big(S^{(n)}(\overline{x}_i+0)-S^{(n)}(\overline{x}_i-0)\big)/h-f^{(n+1)}(\overline{x}_i),$$

where $S(x)$ is a periodic spline of degree $n\geq 0$ and deficiency 1 that interpolates a periodic sufficiently smooth function $f(x)$ at the nodes x_i $(i=0,\pm1,\ldots)$ of a uniform mesh of width h. The nodes of the spline are the points $\overline{x}_i=x_i+h\big(1+(-1)^n\big)/4$.

The expansion coefficients are represented explicitly in terms of the values of the Bernoulli polynomials at 0 for n odd and $1/2$ for n even.

Key words and phrases: polynomial spline, interpolation error, asymptotic expansion.

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Received
March 12, 2001

Translated into English:
Siberian Advances in Mathematics, V. 12, N 2, 48–55 (2002).