Abstract

In the paper the upper estimations of smoothness L_r-module $\omega_m\,(h;\delta)_r$ of order m of the convolution $h = f*g$ of two 2π periodic functions $f \in L_p\,(\mathbb{T})$ and $g \in L_q\,(\mathbf{T})$ are obtained by means of the product expression $\omega_l\,(f;\delta)_p\,\omega_k\,(g;\delta)_q$ of smoothness modules of these functions, where $m, l, k \in \mathbb{N}$, $p, q \in [1,\infty]$, $1/r = 1/p+1/q-1 \geq 0$, $\mathbb{T} =(-\pi,\pi]$. In particular, it is proved in the case $p, q \in (1,\infty)$ that the obtained estimations are exact in the terms of order on classes of convolutions with given majorants of smoothness modules of f and g under some regularity of the majorants in the case $m < l + k$ and under arbitrary majorants in the case $m \geq l + k$.