

Title: New inequalities of Fejér–Jackson-type

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The classical Fejér–Jackson inequality states that for $n \geq 0$ and $x \in [0, \pi]$,

$$\sum_{k=0}^n \frac{\sin((k+1)x)}{k+1} \geq 0.$$

Here, we present an extension and a counterpart of this result. We prove that the inequalities

$$\sum_{k=0}^n \frac{\sin((ck+1)x)}{ck+1} \geq 0 \quad \text{and} \quad \sum_{k=0}^n (-1)^k \frac{\sin((ck+1)x)}{ck+1} \geq 0$$

are valid for all integers $c \geq 1$, $n \geq 0$, and real numbers $x \in [0, \pi]$.

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