

A functional bound for Young's cosine polynomial II

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Abstract. We prove that

$$\sum_{k=1}^{2\lfloor \frac{n}{2} \rfloor + 1} \frac{(-1)^{k-1}}{k} + \sum_{k=1}^n \frac{\cos k\theta}{k} \geq \frac{1}{4} (1 + \cos \theta)^2 \quad (n = 1, 2, 3, \dots; \theta \in (0, \pi)),$$

where equality holds if and only if $n = 2$ and $\theta = \pi - \cos^{-1} \frac{1}{3}$. This refines inequalities due to Alzer et al. and Fong et al.

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