

Title : On a Problem of Littlewood : Counting Zeros of Cosine Polynomials
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Abstract

While every (nice enough) even function $f : [-\pi, \pi] \rightarrow \mathbb{C}$ may be uniquely expressed as a cosine series

$$f(\theta) = \sum_{r \in \mathbb{Z}} C_r \cos(r\theta),$$

the relationship between the sequence of coefficients $(C_r)_{r \in \mathbb{Z}}$ and the behavior of the function f remains mysterious in many aspects. We discuss a solution to a problem of J.E. Littlewood about the behavior of the zeros of cosine polynomials with coefficients $C_r \in \{0, 1\}$.