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A Generalization of Newman's Result on the Zeros of Fourier Transforms

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Abstract. In this paper, the class of complex Borel measures μ , satisfying $\mu(-E) = \overline{\mu(E)}$ for every Borel set $E \subset \mathbb{R}$, such that the functions $f_{\mu,\lambda}$, $\lambda > 0$, defined by

$$f_{\mu,\lambda}(z) = \int_{-\infty}^{\infty} \exp\left(-\frac{\lambda}{2}t^2 + izt\right) d\mu(t),$$

have only real zeros, is completely determined. It is done by establishing a general theorem (Theorem 1.3) on the asymptotic behavior of the zero-distribution of $f_{\mu,\lambda}$ for $\lambda \rightarrow \infty$. The theorem is applied to the Riemann ξ -function.

Keywords. Zeros of Fourier transforms, Riemann's xi-function.

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