

On the zeros of $J_\nu'''(x)$

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The zeros of $J_\nu'''(x)$ are studied by using classical analysis and the properties of $J_\nu(x)$. It is proved that $J_\nu'''(x)$ has infinite positive zeros and between two consecutive positive zeros of $J_\nu(x)$, there exist at least one zero of $J_\nu'''(x)$ for $\nu > 1$. Moreover, several theorems are given regarding their location depending on the values of ν . Also, alternative proofs are given regarding the monotonicity of the positive zeros of $J_\nu'''(x)$ for $\nu > (1 + \sqrt{5})/2$ and $\nu > 1$.

Keywords: Bessel functions; zeros; location; monotonicity

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