Abstract

Let ν be real, $\nu > -1$ and $\nu > Re\mu$, $\mu \in \mathbb{C}$. We prove an inequality which relates the first positive zero of the ordinary Bessel function $J_\nu(z)$ and the absolute value of the real part of any zero of $J_\mu(z)$. Some lower bounds for the absolute value of the complex zeros of $J_\mu(z)$ follow immediately. In particular for μ real and $\mu > -1$, this inequality proves that $(1+\nu)^{-1}\varrho_{\nu,1}$ is a strictly decreasing function in the interval $-1 < \nu < +\infty$, where $\varrho_{\nu,1}$ is the first positive zero of $J_\nu(z)$. A number of simple lower and upper bounds for the first positive zero of $J_\nu(z)$ follow immediately from this result.