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On the Asymptotics of Fourier Coefficients for the Potential in Hill's Equation

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Abstract: We consider Hill's equation $y'' + (q - q)y = 0$ where $q \in L^1[0, \pi]$. We show that if I_n -the length of the n -th instability interval- is of order $O(n^{-k})$ then the real Fourier coefficients a_n, b_n of q are of the same order for $(k=1,2,3)$, which in turn implies that $q^{(k-2)}$, the $(k-2)$ th derivative of q , is absolutely continuous almost everywhere for $k=2,3$.



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