

THE HURWITZ THEOREM FOR BESSEL FUNCTIONS AND ITS CONSEQUENCES FOR ANTIBOUND STATES

MICHAEL S P EASTHAM
mandh@chesilhay.fsnet.co.uk
Department of Computer Science
Cardiff University
PO Box 916, Cardiff CF24 3XF, UK

The Hurwitz theorem states (inter alia) that the Bessel function $J_{-v}(ix)$ has no zeros for real x and $2N < v < 2N + 1$ ($N = 0, 1, \dots$). We derive a number of consequences for the Dirichlet and Neumann antibound states concerning the Bessel and hypergeometric equations, in which the potential has only exponential decay $\sim \exp(-2x)$ at infinity. Little is known about the distribution of resonances and antibound states for this decay, and a number of conjectures are suggested, supported by computational considerations.