Extension of Ambarzumyan's theorem to general boundary conditions

C.K. Law

Department of Applied Mathematics
National Sun Yat-sen University
Kaohsiung, Taiwan 804

Abstract

The classical Ambarzumyan's theorem for the Sturm-Liouville equation states that if the spectrum for the Neumann boundary condition is $\{n^2 : n \in \mathbf{N} \cup \{0\}\}$, then the potential function $q = 0$ a.e. We extend this theorem from the Neumann boundary condition to the general boundary conditions, by imposing an additional condition on the potential function. Our proof makes use of eigenvalue asymptotics instead of the Gelfand- Levitan equation. The result supplements Poschel-Trubowitz's inverse spectral theory. We also have parallel results for vectorial Sturm-Liouville systems.

This is joint work with Hung-Jen Wang, and Hua-Huai Chern who is now at National Taiwan Ocean University.