

# Limit point and limit circle criteria for Sturm-Liouville operators with complex coefficients

Carsten Trunk

TU Ilmenau, Institut für Mathematik,  
Postfach 10 05 65, D-98684 Ilmenau, Germany,  
carsten.trunk@tu-ilmenau.de

The crucial role for the study of deficiency indices of real Sturm-Liouville operators plays the classical result of H. Weyl (1910) about limit point and limit circle classification. In fact, it characterizes the number of  $L^2$ -solutions (one or two). It was extended by A.R. Sims in 1957 and later by B.M. Brown et al. (1999) to the case of Sturm-Liouville expression with complex coefficients. Here, we present a collection of various criteria which allow us to decide to which class of Sims' scheme a given Sturm-Liouville problem with complex coefficients belongs. This is subsequently applied to a second order differential equation defined on a ray in the complex plane which is motivated by the recent intensive research connected with  $\mathcal{PT}$ -symmetric Hamiltonians in non-hermitian Quantum Mechanics.

This talk is based on a joint work with E. Leguizamón (Bogotá), V. Heinz (Ilmenau), and M. Winklmeier (Bogotá).