Square-integrable solutions and Weyl functions for singular canonical systems

H. de Snoo

Boundary value problems for the singular canonical system of differential equations $Jf'(t) - H(t)f(t) = \lambda\Delta(t)f(t)$ are studied in the Hilbert space $L^2_\Delta(\imath)$. With the help of a general monotonicity principle for nondecreasing matrix functions the square-integrable solutions are specified. The main purpose is to determine boundary triplets and Weyl functions for the maximal relation associated to the canonical differential equation in $L^2_\Delta(\imath)$ with possibly unequal defect numbers. It will be shown that the Weyl function M singles out the square-integrable solutions of the corresponding homogeneous system of canonical differential equations, so that M can be regarded as the natural generalization of the Titchmarsh-Weyl coefficient for singular Sturm-Liouville operators in the limit-point case.

This is joint work with J. Behrndt, S. Hassi, and R. Wietsma.