



## TITCHMARSH-SIMS-WEYL THEORY FOR COMPLEX HAMILTONIAN SYSTEMS OF ARBITRARY ORDER

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We consider the Hamiltonian System

$$(1) \quad JY' = (\lambda A + B)Y,$$

where  $iJ$  is self adjoint and unitary. We show how the non-self-adjoint matrix-valued Titchmarsh-Sims-Weyl theory, which was studied by Brown, Evans, and Plum 2003 in the even order case, can be extended to the case of arbitrary order. In this way it also extends the self-adjoint arbitrary order theory which was studied by Hinton and Schneider 2005. The system case also includes the well known scalar theory of higher order.

By constructing matrix-valued Weyl-type circles we obtain an analytic  $M$  function, and finally an operator realisation  $L$  of the given problem. Various calculations yield estimations for the spectrum of  $L$ .

Besides  $L_A^2$ , a second weighted space  $L_{C_\lambda}^2$  appears. The limiting behaviour of the Weyl-type circles is strongly connected to the number of linearly independent solutions of (1) that lie in  $L_{C_\lambda}^2$ .