Limit-Point/Limit-Circle Classification for Sturm-Liouville Problems whose Coefficients Depend Rationally on the Eigenvalue Parameter

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Weyl's limit-point/limit-circle alternative states that for every non-real λ the set of solutions of $(-DpD+q)y=\lambda y$ (the function q is real and measurable, and D denotes differentiation with respect to the single variable) belonging to $L^2(0,\infty)$ is a vector space of dimension 1 or 2, and secondly that either for each $\lambda\in\mathbb{C}$ this solution space has dimension 2 or for each $\lambda\in\mathbb{C}$ its dimension is at most 1. In this talk similar statements are considered for the 2×2 system

$$\mathbb{A}_0=\begin{pmatrix}-DpD+q & -Dc+a\\ cD+a & r\end{pmatrix} \tag{0.1}$$

of formal differential operators, where the coefficient functions $p,q,c,r,a:(0,\infty)\to\mathbb{R}$ are measurable functions with $p\neq 0$ a. e.