Operator Models for Singular Ordinary Differential Expressions

P. Kurasov
joint work with A. Luger

The following singular Sturm-Liouville differential expression

$$l(y) = -y''(x) + \frac{q_0 + q_1 x}{x^2} y(x) \quad \text{for } x \in (0, \infty), \tag{1}$$

with $q_0 > \frac{3}{4}$ and $q_1 \in \mathbb{R}$ is investigated. We introduce a certain singular perturbation with support at the origin and discuss its operator model. The spectral properties of this model are described by a certain generalized Nevanlinna function. The main topic is to explain the relationship between this generalized Q-function and the (generalized) Titchmarsh-Weyl function, recently introduced for this differential expression.