Abstract

In the paper the fourth order spectral problem

$$y^{IV}(x) = \lambda y(x), \quad x \in (0,1)$$

$$y''(0) = y'''(0) = y''(1) = 0,$$

$$y'''(1) + d\lambda y(1) = 0,$$

is considered, where $\lambda \in C$ is a spectral parameter, and $d < 0$ is a physical parameter.

The general characteristic of eigenvalues disposition on a real axis is given, the root space structure and the oscillation properties of eigenfunctions are studied, the asymptotic formulae for eigenvalues and eigenfunctions are derived, and the basis properties in $L_p(0,1)$, $p \in (1,\infty)$ of the system of root functions of this problem is proved.