

## ON THE FUČIK SPECTRUM

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Consider the equation

$$x'' + \mu^2 x^+ - \lambda^2 x^- = 0, \quad (1)$$

together with the boundary conditions

$$\begin{aligned} x(0) \cos \alpha - x'(0) \sin \alpha &= 0, \\ x(\pi) \cos \beta - x'(\pi) \sin \beta &= 0. \end{aligned} \quad (2)$$

Fučik spectrum for  $\alpha = 0$ ,  $\beta = \pi$  (the Dirichlet problem) is known ([1, §35.4]). We obtain the expressions for the Fučík spectrum in the case of boundary conditions of the Sturm-Liouville type (2).

THEOREM 1. *Fučik spectrum for (1), (2) is given by*

$$\begin{aligned} F_{2k}^+ &: \left[ \frac{\pi}{2\mu} - \frac{\arctan(\mu \tan \alpha)}{\mu} \right] + \frac{k\pi}{\mu} + \frac{k\pi}{\lambda} + \left[ \frac{\arctan(\mu \tan \beta)}{\mu} - \frac{\pi}{2\mu} \right] = \pi, \\ F_{2k}^- &: \left[ \frac{\pi}{2\lambda} - \frac{\arctan(\lambda \tan \alpha)}{\lambda} \right] + \frac{k\pi}{\mu} + \frac{k\pi}{\lambda} + \left[ \frac{\arctan(\lambda \tan \beta)}{\lambda} - \frac{\pi}{2\lambda} \right] = \pi, \\ F_{2k+1}^+ &: \left[ \frac{\pi}{2\mu} - \frac{\arctan(\mu \tan \alpha)}{\mu} \right] + \frac{(2k+1)\pi}{2\mu} + \frac{(2k+1)\pi}{2\lambda} + \left[ \frac{\arctan(\lambda \tan \beta)}{\lambda} - \frac{\pi}{2\lambda} \right] = \pi, \\ F_{2k+1}^- &: \left[ \frac{\pi}{2\lambda} - \frac{\arctan(\lambda \tan \alpha)}{\lambda} \right] + \frac{(2k+1)\pi}{2\mu} + \frac{(2k+1)\pi}{2\lambda} + \left[ \frac{\arctan(\mu \tan \beta)}{\mu} - \frac{\pi}{2\mu} \right] = \pi. \end{aligned}$$

### REFERENCES

- [1] A. Kufner and S. Fučík. *Nonlinear differential equations*. Elsevier Scientific, Amsterdam-New York, 1980.