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ON THE FUČIK SPECTRUM

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Consider the equation

$$x'' + \mu^2 x^+ - \lambda^2 x^- = 0, \tag{1}$$

together with the boundary conditions

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

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

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

$$F_{2k}^{+}: \quad \left[\frac{\pi}{2\mu} - \frac{\arctan(\mu\tan\alpha)}{\mu}\right] + \frac{k\pi}{\mu} + \frac{k\pi}{\lambda} + \left[\frac{\arctan(\mu\tan\beta)}{\mu} - \frac{\pi}{2\mu}\right] = \pi,$$

$$F_{2k}^{-}: \quad \left[\frac{\pi}{2\lambda} - \frac{\arctan(\lambda\tan\alpha)}{\lambda}\right] + \frac{k\pi}{\mu} + \frac{k\pi}{\lambda} + \left[\frac{\arctan(\lambda\tan\beta)}{\lambda} - \frac{\pi}{2\lambda}\right] = \pi,$$

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

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

REFERENCES

[1] A.Kufner and S. Fučik. *Nonlinear differential equations.* Nauka, Moscow, 1988. (in Russian)