Proof of this theorem is based on Theorem 4.12.

Let us mention for the illustration that if $\Phi_{+1}(\pi) < 0$ and $\Phi_{-1}(\pi) < 0$ and if the function $f \in L_1(\mathbf{R}^1)$ is such that $f(t) = 0$ for $t \in (-\infty, t_0\rangle$, $f(t) < 0$ for $t \in (t_0, \pi)$ and $f(t) = 0$ for $t \in \langle\pi, +\infty)$, where t_0 is an arbitrary point of the interval $(\pi - \frac{1}{2}\pi(\lambda_1/\mu)^{1/p}, \pi)$, then there exists a weak solution of the boundary value problem (4.5). To prove this assertion it is sufficient to apply Theorem 4.13 and a slightly modified proof of Lemma 4.8.

4.14. Remark. It is interesting to see that if

$$\Phi_{+1}^{(\mu;\nu)}(\pi) \, . \, \Phi_{-1}^{(\mu;\nu)}(\pi) < 0$$

then applying Theorem 4.12 we can prove that there exists a weak solution of the boundary value problem (4.5) for any admissible right hand side. However, the same result was proved using the abstract part of this paper in Theorem 4.6, based on the Leray-Schauder degree.

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