ELLIPTIC PROBLEMS WITH NONMONOTONE DISCONTINUITIES AT RESONANCE (ERRATUM)

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In this note we would like to point out some wrong arguments in [1]. There, we have considered the following elliptic problem at resonance:

$$\begin{gathered} -\operatorname{div}\left(|Dx(x)|^{p-2}Dx(z)\right)-\lambda_1|x(z)|^{p-2}x(z)=f(z,x) \quad \text{a.e. on } Z, \\ x=0 \quad \text{a.e. on } \Gamma. \end{gathered} \tag{1}$$

We do not assume that f is a Carathéodory function. First of all we must change Hypothesis 3.1(ii) to 3.1(ii)$'$, namely, we suppose the following.

Hypothesis 3.1(ii)$'$. There exists $\theta > p$ and $r_0 > 0$ such that for all $|x| \geq r_0$ and all $v \in [f_1(z,x), f_2(z,x)]$, we have $0 < \theta F(x,u) + \lambda_1(1-\theta/p)|x|^p \leq vx$ and, moreover, there exists some $a_1 \in L^1(Z)$ such that $F(z,x) \geq c_3|x|^\theta - a_1(z)$ for every $x \in \mathbb{R}$, with $F(z,x) = \int_0^x f(z,r)dr$.

In our proof in [1], (3.15) does not follow from (3.14) with Hypothesis 3.1(ii). But it is clear that with Hypothesis 3.1(ii)$'$, we arrive at (3.15) and the rest of the proof remains unchanged.

Finally, we would like to point out a serious mistake at [1, Theorem 3.8]. We have used there that any measurable set A with $|A| > 0$ has a nonempty interior, but this is not true. We can construct such a set with an empty interior (e.g., the ε-Cantor set). For a coercive energy functional, we can prove the existence of a solution of type II (see, e.g., [2] for a Neumann problem). But as far as we know for the noncoercive case, we do not have such a result, so it remains an open problem.

References

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