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:

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

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

- [1] H. Nikolaos, *Elliptic problems with nonmonotone discontinuities at resonance*, Abstr. Appl. Anal. 7 (2002), no. 9, 497–507.

- [2] ———, *Neumann boundary value problems with discontinuities*, Appl. Math. Lett. **16** (2003), no. 5, 729–732.

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