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A Class of Elliptic Partial Differential Equations with Exponential Nonlinearities (Corrigendum)

P. A. Vuillermot

Department of Mathematics, University of Texas, Arlington, TX 76019, USA

We wish to correct a faulty argument that slipped into the proof of Step 5 of Proposition 3.1 of [1] (the Palais-Smale Property). The dominated convergence argument following relation (77) on p. 512 may not be applied as indicated. Indeed, the integer $\tilde{N}=\tilde{N}(\varepsilon, x)$ depends on x in general so that it is not clear whether $\chi_i \in E_{Y_i, p_i}$. A correct argument which also provides a simplification may be based on the inequality

$$Y_i\left(\frac{t-\tilde{t}}{2}\right) \leqq (Y_i'(t) - Y_i'(\tilde{t}))(t-\tilde{t}) \tag{1}$$

valid for each $t, \tilde{t} \in \mathbb{R}$, which follows from the convexity property $(\mathscr{P})$ of Definition 1.1 of [1]. Choosing $t = z_{x_i}^N(x)$, $\tilde{t} = z_{x_i}(x)$ and integrating over Ω, we then get

$$\lim_{N\to\infty} \int_\Omega dx p_i(x) Y_i\left(\frac{z_{x_i}^N(x) - z_{x_i}(x)}{2}\right) = 0$$

from the result of Step 4 of Proposition 3.1. Hence $z_{x_i}^N \to z_{x_i}$ strongly in E_{Y_i, p_i} since Y_i satisfies property $(\mathscr{Q})$ of Definition 1.2 of [1]. This proves the conclusion of Step 6 of Proposition 3.1 at once. All of the results remain valid as stated. The above argument corrects in exactly the same way the reasoning in Step 4 of Theorem 2.1 of [2].

References

1. Vuillermot, P.A.: A class of elliptic partial differential equations with exponential nonlinearities. Math. Ann. **268**, 497–518 (1984)
2. Vuillermot, P.A.: A class of Sturm-Liouville eigenvalue problems with polynomial and exponential nonlinearities. Nonlinear Anal. Theory Methods Appl. **8**, 775–796 (1984)

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