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Correction to my paper: "Existence theorems for operator equations and nonlinear elliptic boundary-value problems" [Comment. Math. Univ. Carolinae 14 (1973), 27-46]

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C O R R E C T I O N TO MY PAPER "EXISTENCE THEOREMS FOR
OPERATOR EQUATIONS AND NONLINEAR ELLIPTIC
BOUNDARY-VALUE PROBLEMS", Comment.Math.
Univ.Carolinae 14(1973),27-46

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Professor P. Hess has remarked that the first part of re-
lation (3.5) (Theorem 2)

$$(*) \quad B(0, \mu_0, \mu_0) = \sum_{|\beta| \leq m-1} [B_\beta(\cdot, \xi_{m-1}(\mu_0)), D^\beta \mu_0]$$

is not proved.

We define $D(B)$ as in the paper but only for all
 $\nu \in W := V \cap W_{m^*, \nu}$ and ask for a solution of (3.1) for
all $\nu \in W$.

We assume the following additional condition on $F(x, \xi_{m-1}, \xi'_{m-1})$
(see Assumption 5): To each $\mu \in V$ and $K > 0$ there exists
a function $F_{\mu, K} \in L^1(\Omega)$ such that

$$|F(x, \xi_{m-1}(\mu), \xi_{m-1}(\nu))| \leq F_{\mu, K}(x)$$

a.e. on Ω for all $\nu \in V$ with $|\nu(x)| \leq K$. Further
let $m = 1$.

Under this additional assumptions relation (*) can be
proved. Indeed, for each $K > 0$ we define

$$\Omega_K := \{x \in \Omega : |\mu_0(x)| \leq K\}$$

and set

$$\mu_0^K(x) := \begin{cases} \mu_0(x), & x \in \Omega_K \\ 0, & x \in \Omega \setminus \Omega_K \end{cases}.$$

Then $\mu_0^K \in V$ and $\mu_0^K \rightarrow \mu_0$ in V as $K \rightarrow \infty$. Following the pattern of the proof of Hess (J.Math.Anal.Appl. 43 (1973), 241-249, p.248) for each K there exists a sequence $\{\mu_\nu\} \subset C_0^\infty(\Omega)$ satisfying $\mu_\nu \rightarrow \mu_0^K$ in V , $|\mu_\nu(x)| \leq K$ and $\mu_\nu(x) \rightarrow \mu_0^K(x)$ a.e. on Ω . Hence $B(0, \mu_0, \mu_\nu) \rightarrow B(0, \mu_0, \mu_0^K)$. From $B(0, \mu_0, \mu_\nu) = [B_0(\cdot, \mu_0), \mu_\nu]$ it follows by Assumption 5 (b) and the additional condition on F that the Theorem of Lebesgue is applicable. Hence

$$B(0, \mu_0, \mu_0^K) = [B_0(\cdot, \mu_0), \mu_0^K].$$

By definition of μ_0^K and Assumption 5 (a) the Theorem of Lebesgue again can be applied and (*) with $m = 1$ follows as $K \rightarrow \infty$.

Relation (*) is unsolved for the case $m > 1$. The same remark holds for Theorem 2 in "Nonlinear eigenvalue problems, Comment.Math.Univ.Carolinae 14(1973), 113-126.

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