

Emmanuele, Giovanni

An existence theorem for Hammerstein integral equations. (English) Zbl 0823.45004
Port. Math. 51, No. 4, 607-611 (1994).

The author considers the following Hammerstein integral equation

$$x(t) = g(t) + \lambda \int_D k(t, x) f(s, x(s)) ds, \quad (\text{HIE})$$

D a compact subset of \mathbb{R}^n , g, k, f functions with values in finite- dimensional Banach spaces.

From the author's introduction: "In a recent paper [J. Integral Equations Appl. 4, No. 1, 89-94 (1992; Zbl 0755.45005)] we have been able to dispense with all of these assumptions just assuming that k and f satisfy Caratheodory conditions; but, as observed by J. Banas, even if such a hypothesis is completely natural for f , it is sometimes restrictive when applied to k ; for instance, if to some $k(t, s) = p(t)q(s)$ it implies the continuity of q , whereas requiring that q belongs to some L^r -space would be more natural.

Here we want to show that actually it is possible to have (HIE) under this more general hypothesis; indeed, we present a result in which we assume that f is a Caratheodory function such that F maps $L^1(D, X)$ into $L^2(D, Y)$, continuously, and k is a measurable function such that the functions $s \rightarrow k(t, s)$ belong to L^∞ and K is a linear, continuous operator from $L^1(D, Y)$ into $L^1(D, X)$, where X, Y are finite-dimensional Banach spaces".

Reviewer: U.Kosel (Freiberg)

MSC:

[45G10](#) Other nonlinear integral equations
[45N05](#) Abstract integral equations, integral equations in abstract spaces

Cited in **12** Documents

Keywords:

[nonlinear integral equations](#); [Hammerstein integral equation](#); [Banach spaces](#); [Caratheodory function](#)

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