BULLETIN OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 81, Number 1, January 1975

RESEARCH ANNOUNCEMENTS

The purpose of this department is to provide early announcement of outstanding new results, with some indication of proof. Research announcements are limited to 100 typed lines of 65 spaces each. A limited number of research announcements may be communicated by each member of the Council who is also a member of a Society editorial committee. Manuscripts for research announcements should be sent directly to those Council members whose names are marked with asterisks on the inside back cover.

EXISTENCE THEOREMS FOR NONLINEAR INTEGRAL EQUATIONS OF HAMMERSTEIN TYPE[1]

BY HAIM BREZIS AND FELIX E. BROWDER

Communicated by Murray Protter, March 18, 1974

Let Ω be a σ-finite measure space with measure denoted by dx. A nonlinear integral equation of Hammerstein type on Ω is an equation of the form

$$u(x) + \int_\Omega k(x, y) f(y, u(y))\, dy = v(x) \qquad (x \in \Omega), \tag{1}$$

where we seek a real-valued function u on Ω which satisfies the relation (1) for a given kernel $k(x, y)$, nonlinear function $f(y, u)$, and a given inhomogeneous term v. If u and v are r-vector functions with real components for an integer $r>1$, one speaks of a system of Hammerstein equations where f is a function from $\Omega \times R^r$ into R^r, and for each x and y in Ω, $k(x, y)$ is a linear transformation on R^r.

In two recent papers [1], [2], we have presented new methods of obtaining solutions of Hammerstein equations using techniques from the theory of monotone mappings between Banach spaces. In the present note, we present some new general results on the existence of solutions of Hammerstein equations and systems for the case in which the linear transformation defined by the kernel $k(x, y)$ is compact and in which, therefore, the methods of the theory of compact mappings in Banach

---

AMS (MOS) subject classifications (1970). Primary 47G05; Secondary 47H15, 47H10.

[1] Research supported by NSF grant GP-28148.