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MAXIMAL MONOTONE OPERATORS AND NONLINEAR INTEGRAL EQUATIONS OF HAMMERSTEIN TYPE

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A nonlinear integral equation of Hammerstein type is one of the form

$$(1) \quad u(x) + \int_G K(x, y)f(y, u(y))dy = w(x)$$

where G is a measure space with a σ -finite measure dy , the given function $w(x)$ and the unknown function $u(x)$ are defined on G . In operator-theoretic terms, the problem of determining the solutions of equation (1), with u, w lying in a given Banach space of functions on G , can be put in the form of a nonlinear functional equation

$$(2) \quad u + AN(u) = w$$

with the linear and nonlinear mappings A and N respectively given by

$$(3) \quad Av(x) = \int_G K(x, y)v(y)dy, \quad Nu(x) = f(x, u(x)).$$

In the present note, we apply the theory of maximal monotone operators in Banach spaces to establish general results on the existence of solutions of equation (2) for the reflexive Banach space X . Our results generalize the results of Browder-Gupta [8], Amann [1],

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