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ON A CERTAIN TYPE OF NONLINEAR INTEGRAL EQUATIONS

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1. **Introduction.** The object of this paper is to prove that the nonlinear integral equation

$$\phi(x) = \lambda \left[f(x) + \sum_{i=1}^{m} \int_a^b \cdots \int_a^b K_i(x, s_1, \cdots, s_i) \cdot F_i(s_1, \cdots, s_i, \phi(s_1), \cdots, \phi(s_i)) ds_1 \cdots ds_i \right] \tag{1}$$

has at least one eigenvalue, provided the functionals

$$G_i(x, v) = \int_a^b \cdots \int_a^b K_i(x, s_1, \cdots, s_i) \cdot F_i(s_1, \cdots, s_i, v(s_1), \cdots, v(s_i)) ds_1 \cdots ds_i \tag{2}$$

are fully continuous, and the F_i satisfy a certain linear integrodifferential equation. The solution of (1) is shown to be equivalent to that of a variational problem containing infinitely many parameters. The latter problem, however, can be solved easily by the method of Rayleigh-Ritz, which consists in approaching the solution of the variational problem by a sequence of variational problems containing only a finite number of parameters. The convergence of this procedure is assured by a convergence theorem of Friedrich Riesz.

2. **Preparatory remarks.** Let I be the closed interval $a \leqq x \leqq b$, and L^2 the class of all functions having Lebesgue integrable squares on I with a norm not larger than N^2. Let, further, $\{v_n(x)\}$ $(n = 1, 2, 3, \cdots)$

Received by the editors May 18, 1944.