

THE NEWTON-KANTOROVICH APPROXIMATIONS FOR NONLINEAR SINGULAR INTEGRAL EQUATIONS WITH SHIFT

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ABSTRACT. We obtain a result on the convergence for the Newton-Kantorovich method applied to a class of singular integral equations with shift (SIES). We study the convergence of the approximations in the case the operator associated to the equation has a local Lipschitz derivative.

1. Introduction. There is a large literature on the classical theory of nonlinear singular integral equations (SIE) (see [6], [7], [15], [16]) and on the successful theory of the non linear singular integral equations with shift (SIES) (see for example [10], [11], [18]).

The approximate solutions of nonlinear equations, involving integral operators on closed curves, have been intensively investigated by using many approximation methods, specially the modified Newton-Kantorovich method, the method of reduction, of collocation and of mechanical quadratures. In the theory of the approximate solutions of nonlinear singular integral equations, many results are obtained by applying the modified Newton-Kantorovich method under the classical hypothesis of global Lipschitz continuity of the derivative of the operator associated to the equation (see [1], [2]).

In this paper, our aim is to apply the Newton-Kantorovich method (faster than the modified method) to a class of singular integral equations under the weaker hypothesis of local Lipschitz continuity of the derivative.

In particular we study, in a generalized Hölder space $\mathcal{H}_\varphi(\Gamma)$, the

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