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ON WELL-POSEDNESS OF ONE-SIDED NONLINEAR BOUNDARY VALUE PROBLEMS FOR ANALYTIC FUNCTIONS

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ABSTRACT. We consider two model "one-sided" nonlinear boundary value problems for analytic functions, namely, the power type Riemann-Hilbert problem and the modulus problem.

Our main question is how to make the problems well-posed, i.e., to find classes of functions in which these problems possess a unique solution. These classes are those with prescribed collections of zeros in the domains and/or on their boundaries.

1. Introduction. Linear boundary value problems for analytic functions are well-studied due to numerous applications in different branches of mathematics, mechanics, queueing theory, etc. (background expositions can be found in [**1**], [**6**]). The corresponding nonlinear problems which also occur in a lot of applications are less investigated because of the much more complicated technique that needs to be used. For a description of the results in the area, we refer to the surveys [**7**], [**9**], [**11**] and to the books [**3**], [**5**], [**12**] and to the literature cited there. Among the approaches presented are those of a constructive nature (see e.g. [**5**, [**7**], [**9**] where the analytic methods applied in the linear case are generalized). The latter methods cannot always be generalized for the nonlinear case especially if we consider so-called "one-sided" problems posed for one unknown function analytic in the domain satisfying certain conditions on the boundary.

This article is connected with the paper [**10**] in which the classes of analytic functions were found in order for the nonlinear conjugation problem to be uniquely solvable. These are classes of functions with

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