A RIEMANN-HILBERT APPROACH TO TOEPLITZ OPERATORS AND THE CORONA THEOREM

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Together with differential operators,Toeplitz operators (TO) constitute one of the most important classes of non-self adjoint operators, and they appear in connection with various problems in physics and engineering. The main topic of my presentation will be the interplay between TOs and Riemann-Hilbert problems (RHP),and the relations of both with the corona theorem. It has been shown that the existence of a solution to a RHP with 2×2 coefficient G, satisfying some corona type condition, implies - and in some cases is equivalent to - Fredholmness of the TO with symbol G. Moreover, explicit formulas for an appropriate factorization of G were obtained, allowing to solve different RHPs with coefficient G and to determine the inverse, or a generalized inverse, of the TO with symbol G.

However,those formulas depend on the solutions to 2 meromorphic corona problems. These solutions being unknown or rather complicated in general, the question whether the factorization of G can be obtained without the corona solutions is a pertinent one. In some cases, it already has a positive answer; how to solve this question in general is open, and all the more so in the case of $n \times n$ matrix functions G, for which the results regarding the 2×2 case have recently been generalized.