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Riemann boundary value problem and singular integral equations with piecewise-continuous coefficients on rectifiable curves

There is solved the piecewise-continuous Riemann boundary value problem in an explicit form for expanded in comparison with the previous results classes of Jordan (closed or open) rectifiable curves and given functions G and g on these curves. Under this there is investigated an influence of properties of the curve and singularities of given functions on the solvability of Riemann boundary value problem.

The solvability of the piecewise-continuous homogeneous Riemann boundary value problem is obtained on an arbitrary Jordan (closed or open) rectifiable curve and described under minimal assumptions on the coefficient G of the problem.

The corresponding equivalence of homogeneous problems on a closed curve and on an open one is established.

At the same time the nonhomogeneous problem is solved on an open curve under the additional assumptions about a conjugation line in comparison with corresponding results on a closed curve.

The characteristic singular integral equation with the Cauchy kernel is solved in an explicit form for expanded in comparison with the previous results classes of closed Jordan rectifiable curves in the case, where the coefficients of this equation have discontinuities of a first kind and of a second one in points of the set T , where $T := \{a_1, a_2, \dots, a_m\}$ is a finite set of fixed points of given curve γ .

In the case, where the coefficients of singular integral equation have discontinuities of a first kind in points of the set T , there are established sufficient conditions for Noetherian properties of singular integral equation with the Cauchy kernel on a closed Jordan rectifiable curve.
