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The Dirichlet problem for the Stokes system and the integral equations' method. (English)

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Summary: A boundary value problem for the Stokes system is studied in a cracked domain in $\mathbb{R}^n$, $n > 2$, where the Dirichlet condition is specified on the boundary of the domain. The jump of the velocity and the jump of the stress tensor in the normal direction are prescribed on the crack. We construct a solution of this problem in the form of appropriate potentials and determine the unknown source densities via integral equations' systems on the boundary of the domain. The solution is given explicitly in the form of a series. As a consequence, a maximum modulus estimate for the Stokes system is proved.

MSC:

76D07 Stokes and related (Oseen, etc.) flows
76M25 Other numerical methods (fluid mechanics) (MSC2010)