

Three-phase eccentric annulus subjected to a potential field induced by arbitrary singularities

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Abstract

An infinite planar, three-component heterogeneous medium with a pair of circles as interfaces between homogeneous zones forming an eccentric annulus is considered for refraction of a potential field on the two interfaces. The velocity field is generated by an arbitrary system of singularities of arbitrary order, in congruity with the Milne-Thomson case of a two-component medium and a single circular interface. An exact analytical solution of the corresponding R{double-struck}-linear conjugation problem of two Laplacian fields in the eccentric annulus structure is derived in the class of piecewise meromorphic functions with fixed principal part. Three general cases of loci of the singularities with respect to the interfaces are investigated. Flow nets (isobars and streamlines) are presented. © 2011 Brown University.

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Keywords

Analytic functions, Heterogeneous media, Refraction, R{double-struck}-linear conjugation problem