ON THE R-BOUNDEDNESS OF SOLUTION OPERATOR FAMILIES FOR TWO-PHASE STOKES RESOLVENT EQUATIONS

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Abstract	The aim of this paper is to show the existence of R-bounded solution operator families for two-phase Stokes resolvent equations in Omega = Omega(+)boolean OR Omega(-), where Omega(+/-) are uniform W-r(2-1/r) domains of N-dimensional Euclidean space R-N (N >= 2, N < r < infinity). More precisely, given a uniform W-r(2-1/r) domain Omega with two boundaries Gamma(+/-) satisfying Gamma(+)boolean AND Gamma(-) = phi, we suppose that some hypersurface Gamma divides Omega into two sub-domains, that is, there exist domains Omega(+/-) subset of Omega such that Omega(+) boolean AND Omega(-) = phi and Omega \ Gamma = Omega(+) boolean OR Omega(-), where Gamma boolean AND Gamma(+) = phi, Gamma boolean AND Gamma(-) = phi, and the boundaries of Omega(+/-) consist of two parts Gamma and Gamma(+/-) respectively. The domains Omega(+/-) are filled with viscous, incompressible, and immiscible fluids with density rho(+/-) and viscosity mu(+/-), respectively. Here, rho(+/-) are positive constants, while mu(+/-) = mu(+/-)(x) are functions of x is an element of R-N. On the boundaries Gamma, Gamma(+), and Gamma(-), we consider an interface condition, a free boundary condition, and the Dirichlet boundary condition, respectively. We also show, by using the R,-bounded solution operator families, some maximal L-p-L-q regularity as well as generation of analytic semigroup for a time-dependent problem associated with the two-phase Stokes resolvent equations. This kind of problems arises in the mathematical study of the motion of this paper is the unique solvability of a weak elliptic transmission problem for f is an element of W-q(1)(Omega) to the variational problem: (rho(-1) del theta, del phi)(Omega) = (f, del phi)(Omega) for any phi is an element of Omega(+)), nto = rho(-) (x is an element of Omega(-)), where rho (s defined by rho = rho(+) (x is an element of Omega(+)), nto = rho(-) (x is an element of Omega(-)), and W-q(1)(Omega) is a suitable Banach space endowed with norm parallel to . parallel to (Wq1(Omega)) := parallel to del . par
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