1036-76-59   **Svetlana Tlupova*** (`stlupova@njit.edu`), Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ 07102, and **Ricardo Cortez**. *The Boundary Integral Method for Stokes-Darcy Problems.*

This work addresses the development of a numerical method for a problem where a free fluid flow is coupled with flow through a porous medium. This situation arises in many industrial applications, such as filtration, underground water flow in hydrology, oil recovery in petroleum engineering, fluid flow through body tissues and others. Stokes flows appear in many applications where the fluid viscosity is high and/or the velocity and length scales are small. The flow through a porous medium can be described by Darcy's law. Complications are caused by coupling systems of different orders in different regions and choosing the correct interface conditions. Our approach is based on the boundary integral formulation for computing the fluid/porous medium problem with higher accuracy using fundamental solutions of Stokes and Darcy's equations. We regularize the kernels to remove the singularity for stability of numerical calculations and eliminate the largest error for higher accuracy. (Received January 05, 2008)