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Drag Force on Droplet in Filtration Process MAXIM MIKHAYLENKO, ALEX POVITSKY, The University of Akron — The drag force is studied for particles and droplets with their axis tilted with respect to Stokes flow. Boundary singularity method is adopted to solve the problem. While in stationary flow the droplet is turned so as its axis is parallel to the flow. In fiber filtration problems droplet is either attached to a fiber at an arbitrary angle between flow and fiber or is recently detached from a fiber and still turned with respect to flow. In addition, fluid droplets may form by merging of unequal droplets or form asymmetric shapes under action of gravity. In many studies Stokes force acting on arbitrary shaped particle is determined by calculating radius of spherical particle with either volume or surface same as of an original particle, and using Stokes formula. Since the approach is heuristic, the correcting coefficient is used to adhere to a particular class of particle shapes. The magnitude of drag is changed substantially with the angle. Therefore the approach of equivalent volume sphere is not valid for determination of drag for considered cases. The pressure and shear stress at the particle surface are obtained to explain the behavior of the drag with its maximum at 45 degrees. The droplets attached to a fiber are considered and the effects of fiber on the drag are studied.

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