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Two ball interaction while settling in an Oldroyd-B fluid: one atop the other initially TSORNG-WHAY PAN, Dept. of Mathematics, University of Houston, SHANG-HUAN CHIU, Dept. of Scientific Computing, Florida State University, ROLAND GLOWINSKI, Dept. of Mathematics, University of Houston — In this talk we present a numerical study of two ball interaction while settling in a vertical channel with a square cross-section filled with an Oldroyd-B fluid. Two balls are released one atop the other initially and the effects of particle inertia and fluid inertia are not ignored. We have obtained that either the trailing ball catches up the leading one to form a chain or two balls separate with a stable final distance at the end. For the cases of the ball density slightly heavier than that of the fluid, they can form a vertical chain or tilted chain. But when increasing the ball density, the two balls can form a chain for smaller initial gaps; but they move away from each other and the distance between two balls reaches a constant for a larger initial gap at higher elasticity number. Thus the two ball chain formation is up to, at least, the ball settling speed (i.e., the ball density), initial gap between two balls and elasticity number. Also the fluid polymer extension limit has its effect on the formation of two ball chain when they settle in a FENE type of viscoelastic fluid.

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