Numerical simulation of particle migration in rotating eccentric cylinders BRIAN PALMER, DIWEN MENG, PARISA MIRBOD, Clarkson University — In this study we numerically investigate the particle migration in a concentrated suspension undergoing flow between rotating eccentric cylinders observed in an experiment by Subia et al. (1998) J. Fluid Mech., 373. There are two mathematical models developed to explain particle migration phenomenon, namely, suspension balance model and diffusive flux model. These models have been successfully applied to explain migration behavior in several two-dimensional flows. However, compared with two-dimensional simulation, three-dimensional simulation is able to produce relatively realistic results. In this work, we have carried out numerical simulation of concentrated suspension flow in 3D eccentric cylinder geometry using suspension balance model and finite element methods. The simulation method was validated with available analytical solutions for circular Couette flow. Therefore, the simulation technique was applied to study the flow of concentrated suspensions through rotating eccentric cylinders. The detailed comparison of numerical simulation results is made with the experimental data.

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