# Pattern formation and axial instability of a free-surface front in a rimming flow

배선혁, 김도현*
KAIST 생명화학공학과, 초미세화학공정시스템 연구센터
(DoHyun.Kim@kaist.ac.kr*)

Rimming flow of highly viscous fluid partially filled in a horizontally rotating cylinder shows various patterns depending on inertia, gravity, viscosity and surface tension. In this study we performed computational study on the effects of process parameters such as rotating speed of cylinder, fluid property and fluid filling fraction on the patterns of rimming flow. We observed and classified two distinct states, homogenous film and bump state, by modified Jeffreys number which is proportional to the viscosity and rotating speed and inversely proportional to the fluid filling fraction. A numerical linear stability analysis is carried out to examine the onset of unstable axial mode.