Research

# Colloquium

# Numerical simulations for Newtonian vesicles suspended in viscoelastic fluid

主講人：賴明治 教授
國立交通大學應用數學系

時　間：107 年 4 月 11 日(三) 14：30

地　點：應用數學系多媒體教室（理 408 室）

摘　要：

In this talk, an immersed boundary method is introduced to simulate the dynamics of Newtonian vesicle in viscoelastic Oldroyd-B fluid under shear flow. The viscoelasticity effect of extra stress is well incorporated into the immersed boundary formulation using the indicator function. Our numerical methodology is first validated in comparison with theoretical results in purely Newtonian fluid, and then a series of numerical experiments is conducted to study the effects of different dimensionless parameters on the vesicle motions. Although the tank-treading (TT) motion of Newtonian vesicle in Oldroyd-B fluid under shear flow can be observed just like in Newtonian fluid, it is surprising to find that the stationary inclination angle can be negative without the transition to tumbling (TB) motion. Moreover, the inertia effect plays a significant role that is able to turn the vesicle back to positive inclination angle through TT-TB-TT transition as the Reynolds number increases. This is a joint work with Yunchang Seol, Yu-Hau Tseng, and Yongsam Kim.