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The dynamics of inextensible capsules in shear flow under the effect of the natural state[1] TSORNG-WHAY PAN, Univ of Houston, XITING NIU, None, ROLAND GLOWINSKI, Univ of Houston — The effect of the natural state on the motion of an inextensible capsule in two-dimensional shear flow has been studied numerically. The energy barrier based on such natural state plays a role for having the transition between two well-known motions, tumbling and tank-treading (TT) with the long axis oscillating about a fixed inclination angle (a swinging mode), when varying the shear rate. Between tumbling and TT with a swinging mode, the intermittent region has been obtained for the capsule with a biconcave rest shape. The estimated critical value of the swelling ratio for having the intermittent region is < 0.7, i.e., the capsule with the rest shape closer to a full disk has no intermittent behavior. The capsule intermittent behavior is a mixture of tumbling and TT. Just like the TT with a swinging mode, which can be viewed as TT with an incomplete tumbling, the membrane tank-treads backward and forward within a small range while tumbling. The transition between tumbling and TT with a swinging mode has been studied.

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Tsorng-Whay Pan
Univ of Houston

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