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Analysis of slippery droplet on tilted plate by development of optical correction method[1] HAN SEO KO, YEONGHYEON GIM, SUNG HO CHOI, DONG KYU JANG, DONG KEE SOHN, Sungkyunkwan University — Because of distortion effects on a surface of a sessile droplet, the inner flow field of the droplet is measured by a PIV (particle image velocimetry) method with low reliability. In order to solve this problem, many researchers have studied and developed the optical correction method. However, the method cannot be applied for various cases such as the tilted droplet or other asymmetric shaped droplets since most methods were considered only for the axisymmetric shaped droplets. For the optical correction of the asymmetric shaped droplet, the surface function was calculated by the three-dimensional reconstruction using the ellipse curve fitting method. Also, the optical correction using the surface function was verified by the numerical simulation. Then, the developed method was applied to reconstruct the inner flow field of the droplet on the tilted plate. The colloidal droplet of water on the tilted surface was used, and the distorted effect on the surface of the droplet was calculated. Using the obtained results and the PIV method, the corrected flow field for the inner and interface parts of the droplet was reconstructed. Consequently, the error caused by the distortion effect of the velocity vector located on the apex of the droplet was removed.

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