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Wake transitions of flexible foils in a viscous uniform flow MIN JE KIM, JAE HWA LEE, Ulsan National Institute of Science and Technology — We perform numerical simulations for two types of rigid and flexible thin foils in a viscous uniform flow to explore the effect of flexibility on wake structures. The thin foils are prescribed by the heaving oscillation motions and the relevant non-dimensional parameters are the chord length based Strouhal number and flapping amplitude. When the dynamical features of the flow wakes are varied with respect to the two parameters, it is possible to make a direct comparison between a rigid and flexible thin foils. The wake transition boundaries of the rigid thin foil are predicted by constant amplitude based Strouhal number lines, consistent with previous studies. However, contrary to the observation from the rigid thin foil, the wake transition boundaries of the flexible thin foil are not predictable by constant amplitude based Strouhal number lines. We find that the sum of the leading and trailing edge circulations plays an important role to determine a wake pattern behind a rigid and flexible foil, and wake transitions are observed beyond critical circulations. -/abstract- This research was supported by the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF-2017R1D1A1A09000537) and the Ministry of Science, ICT & Future Planning (NRF-2017R1A

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