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Lift generation by a two-dimensional symmetric flapping wing TAKAJI INAMURO, KEIGO OTA, KOSUKE SUZUKI, Department of Aeronautics and Astronautics, Kyoto University — Two-dimensional symmetric flapping flight is investigated by an immersed boundary-lattice Boltzmann method. In the method we can treat the moving boundary problem efficiently on the Cartesian grid. First, we investigate the effect of the Reynolds number on flows around symmetric flapping wings under no-gravity field and find that at high Reynolds numbers asymmetric vortices are appeared and the time-averaged lift force is induced on the wings, while at low Reynolds numbers only symmetric vortices are appeared around the wings and no lift force is induced. Also, the effect of the initial position of the wings on the lift force is investigated. Secondly, we carry out free flight simulations under gravity field for various Reynolds and Froude numbers and find the region where upward flights are possible.

Takaji Inamuro
Department of Aeronautics and Astronautics, Kyoto University

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