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Computational Aerodynamics of Insects' Flapping Flight KYUNG DONG YANG, Blair Academy, RICHARD KYUNG, Seoul National University — The kinematics of the Insects' flapping flight is modeled through mathematical and computational observations with commercial software. Recently, study on the insects' flapping flight became one of the challenging research subjects in the field of aeronautics because of its potential applicability to intelligent micro-robots capable of autonomous flight and the next generation aerial-vehicles. In order to uncover its curious unsteady characteristics, many researchers have conducted experimental and computational studies on the unsteady aerodynamics of insects' flapping flight. In the present paper, the unsteady flow physics around insect wings is carried out by utilizing computer software e-AIRS. The e-AIRS (e-Science Aerospace Integrated Research System) analyzes and models the results of computational and experimental aerodynamics, along with integrated research process of these two research activities. Stroke angles and phase angles, the important two factors in producing lift of the airfoils are set as main parameters to determine aerodynamic characteristics of the insects' flapping flight. As a result, the optimal phase angle to minimize the drag and to maximize the lift are found. Various simulations indicate that using proper value of variables produce greater thrust due to an optimal angle of attack at the initial position during down stroke motion.

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