Computational Aerodynamics of Insects’ Flapping Flight KYUNG
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The kinematics of the Insects’ flapping flight is modeled through mathematical and
computational observations with commercial software. Recently, study on the in-
sects’ 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 experi-
mental 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 characteris-
tics 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.