Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

The advantage of wing-wing interaction in unsteady motion TUYEN QUANG LE, Konkuk Univerisity, DOYOUNG BYUN, SOO HYUNG PARK, Konkuk University, JIN HWAN KO, Seoul National University, HOON CHOEL PARK, Konkuk University — The role of elytra in aerodynamic performance of flapping flight has been numerically investigated for beetle flight. In a case of hovering flight, the relatively small vertical or horizontal forces were generated by the elytra and no significant contribution to aerodynamic force from elytra and hindwing interaction of Coleopteran insect. On the other hand, the flapping elytra may increase the total force around 20% on both wings by the wing-wing interaction such as flow blocking and flow acceleration between the wings in forward flight. The flow blocking and acceleration strongly depends on phase angle, gap between wings. Additionally, the optimal condition for thrust force generation and aerodynamic efficiency was found from parameter study of in- and out-phase angles combined with gap between two airfoils.

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Date submitted: 05 Aug 2010 Electronic form version 1.4