

Abstract Submitted
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Characterization of Rotor-Rotor Aerodynamic Interactions for Free Flight Studies of Multirotor Systems¹ MARCEL VEISMANN, MORTEZA GHARIB, Caltech — As multirotor systems are increasingly utilized for academic as well as commercial purposes, their aerodynamics require precise identification for performance evaluation and more reliable predictive models. However, the interactions between closely arranged rotors have been given little attention. In order to account for the interactional effects on generated thrust, we developed an analytic expression derived from experimental data that is dependent on geometric and operational parameters, specifically rotor separation, rotational speeds, and Reynolds number. We find that the thrust reduction caused by the flow of neighboring rotors must be considered to accurately predict a multirotor system's cumulative propulsive force. Using this analytical model, we aim to quantify rotor performance in various free flight conditions.

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