Abstract: The paper presents the identification of a quadrotor’s bare-airframe dynamics in hover by employing frequency domain methods commonly applied to large-scale rotorcraft and fixed-wing aircraft. Flight tests are conducted with a combination of manual and automated inputs to enable excitation over a wide frequency range to achieve universal model applicability. In contrast to other publications on the topic of micro aerial vehicle system identification, all flight tests are performed outdoors where only inertial MEMS sensors and GNSS measurements are available. Our approach relates physical system parameters of the bare-airframe to the linear control and stability derivatives which are estimated by the identification process. The identified models are validated in terms of their time domain behavior by injecting step perturbations to the motor commands. The obtained information of the quadrotor’s bare-airframe dynamics is used for controller synthesis and for validation of high-fidelity physical simulations.


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Occurences: