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CFD methodology of a model quadrotor BURAK SUNAN, Bahcesehir University — This paper presents an analysis of the aerodynamics characteristics of a quadrotor for both steady and unsteady flows. For steady flow cases, aerodynamics behaviour can be defined readily for any aerial vehicles in wind tunnels. However, unsteady flow conditions in wind tunnels make experimental aerodynamics characterizations difficult. This article describes determination of lift, drag and thrust forces on a model quadrotor by using CFD (Computational Fluid Dynamics) software ANSYS Fluent. A significant issue is to find a new CFD methodology for comparison with the experimental results. After getting sufficiently close agreement with some benchmarking experiments, the CFD methodology can be performed for more complicated geometries. In this paper, propeller performance database experiments from Ref. 1 will be used for validation of the CFD procedure. The results of the study reveals the dynamics characteristics of a quadrotor. This demonstrates feasibility of designing a quadrotor by CFD which saves time and cost compared to experiments.

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