Design and Stability Analysis of Fixed Wing - VTOL UAV

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Abstract : There are primarily two types of Unmanned Aerial Vehicle (UAVs), namely, multirotor and fixed wing. Each type has its own advantages. This study introduces a design of a fixed wing vertical take-off and landing (VTOL) UAV. The design is classified as ready-to-fly (RTF) fixed wing UAV. This means that the UAV is capable of not only taking off, landing, or hovering like a multirotor aircraft but also cruising like a fixed wing UAV. In this study, the conceptual design of 15 kg takeoff weight twin-tail boom configuration FW-VTOL plane is carried out, the initial sizing of the plane is conducted, and both the horizontal and vertical tail configurations are estimated. Moreover, the power required for each stage of flight is determined. Finally, the stability analysis of the plane based on this design is performed, the results shows that this design based on the suggested flight mission is stable and can be utilized.

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