

Autonomous Landing of UAV on Moving Platform: A Mathematical Approach

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Abstract : Recently, the popularity of Unmanned aerial vehicles (UAVs) has skyrocketed amidst the unprecedented events and the global pandemic, as they play a key role in both the security and health sectors, through surveillance, taking test samples, transportation of crucial goods and spreading awareness among civilians. However, the process of designing and producing such aerial robots is suppressed by the internal and external constraints that pose serious challenges. Landing is one of the key operations during flight, especially, the autonomous landing of UAVs on a moving platform is a scientifically complex engineering problem. Typically having a successful automatic landing of UAV on a moving platform requires accurate localization of landing, fast trajectory planning, and robust control planning. To achieve these goals, the information about the autonomous landing process such as the intersection point, the position of platform/UAV and inclination angle are more necessary. In this study, the mathematical approach to this problem in the X-Y axis based on the inclination angle and position of UAV in the landing process have been presented. The experimental results depict the accurate position of the UAV, intersection between UAV and moving platform and inclination angle in the landing process, allowing prediction of the intersection point.

Keywords : autonomous landing, inclination angle, unmanned aerial vehicles, moving platform, X-Y axis, intersection point

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