FINAL PROJECT

STATIC AND DYNAMIC ANALYSIS OF UNMANNED AERIAL VEHICLE (UAV) LANDING GEAR SYSTEM CONSIDERING GEOMETRIC CHARACTERISTICS

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ABSTRACT

Landing gear of aircraft is an essential part of the safety system concerning landing and take off. This research presents a landing gear system based on a three-bar linkage mechanism. It is analyzed by various in geometry (link dimension) in order to obtain the characteristic of landing gear such as stiffness, displacement, acceleration and optimum link dimension associated with static and dynamic analysis.

The landing gear model is developed by using commercial design software and it analyzed by an analytical approach. It is assumed as one degree of freedom mass-spring system in order to reduce the complexity to a manageable level. Geometry analysis is involved in order to design the movement of the linkage mechanism. Next, static analysis is conducted to find out the stiffness and maximum load that can be achieved by the system. Lastly, dynamic analysis is performed in order to know the characteristic of landing gear in a dynamic phenomenon. Furthermore, it is used to ensure the landing gear has high stability and good convenience which related to displacement and acceleration responses.

The result of this research explains that the responses of the landing gear are influenced by geometry configuration. It shows the stiffness of the system is a function of geometry (link dimension). Moreover, the stiffness affects the response of the system in both static and dynamic. The higher stiffness produces lower displacement response but a higher acceleration and vice versa. Therefore, the optimum landing gear is selected based on displacement and acceleration responses which these two parameters need to placed in allowable range in order to reach high stability and good convenient.

Key Words : Landing Gear, Geometry, Analytical Approach, Static, Dynamic, Optimum Model