Carrier-based aircraft landing energy storage

What are the key technologies of carrier-based aircraft in the landing process?

Abstract: The key technologies of carrier-based aircraft in the landing process include deck motion prediction and compensation, radar noise suppression, disturbance suppression of aft flow and wave-off decision.

What are the main contributions of a carrier-based aircraft longitudinal automatic landing model?

The main contributions of the present paper are as follows: (1) A carrier-based aircraft longitudinal automatic landing mathematical model is designed that contains actuator faults and nonlinear terms; (2) An observer and fault-tolerant control algorithm are designed, which are realized in a collaborative approach. Fig. 1.

Can carrier-based aircraft be controlled in the landing process?

The study provides a theoretical reference for the control of carrier-based aircraft landing. Conferences > 2021 6th International Confer... The key technologies of carrier-based aircraft in the landing process include deck motion prediction and compensation, radar noise suppression, disturbance suppression of aft flow and wave-off decision.

What is the risk of landing a carrier based aircraft?

1. Introduction The landing of the carrier-based aircraft has a high-risk potential,as it is subject to disturbances from the deck movement and airwake turbulence,which may result in accidents with the limited landing area ,,,.

Is automatic landing an inevitable trend in carrier-based aircraft landing?

On the contrary,there may be a serious collision risk with the stern of the carrier ,,. Therefore,automatic landing is an inevitable trendin the development of carrier-based aircraft landing. The current automatic landing algorithms mainly focus on the landing state deviations.

Do carrier-based aircraft perform a landing task after executing a mission?

However,the carrier-based aircraft typically performs the landing task after executing a mission,which may cause significant changes in aircraft mass and potential fault associated with the mission. It is necessary to consider abnormal situations such as faults,state deviations,and nonlinearity of the equations of motion comprehensively.

The simulation results showed that the method can effectively simulate the landing process of a carrier-based aircraft with strong nonlinear complex loads, which can provide a reference for the ...

The aircraft carrier requires a full length flight deck and storage facilities for the aircraft that it can launch and recover [23]. The nuclear-powered USS Nimitz (CVN-68) aircraft carrier [24] is shown in Fig. 14.13 with numerous aircraft on its flight deck.

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This paper considers the automatic carrier landing problem of carrier-based aircrafts subjected to constraints, deck motion, measurement noises, and unknown disturbances. The iterative model predictive control (MPC) strategy with constraints is proposed for automatic landing control of the aircraft. First, the long short-term memory (LSTM) neural network is used ...

Aircraft carriers have over the years evolved from balloon-carrying wooden vessels into nuclear-powered vessels carrying entire squadrons of fixed- and rotary-wing aircraft. Since their introduction, they have allowed naval forces to project air power great distances without having to depend on local bases for staging aircraft operations.Balloon carriers were ...

Precise and safe landing of high-performance unmanned aerial vehicles on aircraft carriers is the focus of today"s Carrier-based aircraft [].However, in the process of Carrier-based aircraft landing, due to the deck movement caused by the action of sea waves, the influence of "cock wake" at the tail of the aircraft carrier, and various possible flight failures, ...

Carrier-based aircraft landing involves complex system engineering characterised by strong nonlinearity, significant coupling and susceptibility to environmental disturbances, and autonomous landing of ...

Aircraft and landing gear dynamics shall be integrated to perform a complete landing simulation. This fact emphasizes, even more, the need for finding a good compromise between modeling complexity ...

The catapult process of a carrier-based aircraft includes multiple links such as catapult tensioning, separation of the holding rod, dragging and running, separation of the catapult and drag shuttle, and free running. The ...

The announcement states that the Energy Storage System (ESS), which stores energy from the ship in flywheels for immediate use in launching aircraft, will not be part of this planned contracting effort. ... The MQ-25 will be the world"s first operational, carrier-based unmanned aircraft and is integral to the Air Wing of the Future Family of ...

demonstrate that upon landing, an aircraft has enough kinetic energy, which if recovered could power a 5-minute engineless taxiing process. When scaled to a large fleet such as low-cost ...

In today"s aircraft, electrical energy storage systems, which are used only in certain situations, have become the main source of energy in aircraft where the propulsion system is also converted into electrical energy

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(Emadi & Ehsani, 2000).For this reason, the importance of energy storage devices such as batteries, fuel cells, solar cells, and supercapacitors has ...

The engagement of the arresting hook with the arresting cable is a critical maneuver that most directly reflects the success of arrestment and serves as the most complex stage in terms of dynamics in the carrier-based aircraft landing process [1,2].Carrier-based UAVs usually land in a collision [].To achieve a successful arrest on a carrier, UAVs must approach ...

The landing of the carrier-based aircraft has a high-risk potential, as it is subject to disturbances from the deck movement and airwake turbulence, which may result in accidents with the limited landing area [1], [2], [3], [4].Most recovery operations of an aircraft aboard a carrier are still carried out by human pilots, and manual landing operations are full of challenges.

Automatic carrier landing of carrier-based aircraft is a complex system engineering. This paper summarizes the development of automatic carrier landing system (ACLS) and key techniques of guidance and control for carrier landing. The development history and design specification of the ACLS are described. The basic framework and operational ...

A drawing of the linear induction motor used in the EMALS. The Electromagnetic Aircraft Launch System (EMALS) is a type of electromagnetic catapult system developed by General Atomics for the United States Navy.The system launches carrier-based aircraft by means of a catapult employing a linear induction motor rather than the conventional steam piston, providing ...

Aiming at the identification of potential landing sites, an end-to-end state estimation method for the autonomous landing of carrier-based UAVs based on monocular vision is proposed in this paper ...

Modern air combat will take place more on the sea by carrier-based aircraft. Carrier-based aircraft not only endows the carrier with powerful combat capability, but also brings new challenges, among which the landing process has the most influential factors and the highest risk [].Although the landing process is short, it is extremely difficult and breath-taking.

In this paper, we proposed an auxiliary system for the aircraft catapult using the new superconducting energy storage. It works with the conventional aircraft catapult, such as ...

To enable a carrier-based unmanned aerial vehicle (UAV) to track the desired glide trajectory and safely land on the deck with the presence of system faults, this paper proposes a neural network-based adaptive sliding mode fault-tolerant control (NASFTC) method. Firstly, the dynamic model of the carrier -based UAV, the actuator fault model, the additional ...

For energy demand management and sustainable approach to intelligent buildings, Carrier propose Thermal

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Energy Storage technology (TES) by latent heat. Shift your electricity consumption from peak to off peak hours. The TES technology consists of Phase Change Materials (PCM) used to store in nodules the cooling thermal energy produced by chillers.

The key technologies of carrier-based aircraft in the landing process include deck motion prediction and compensation, radar noise suppression, disturbance suppression of aft flow and wave-off decision. In this paper, the key technologies in the process of landing is summarized and generalized, including the methods of deck motion compensation and prediction, the current ...

1 School of Aeronautics, Northwestern Polytechnical University, Xi"an 710072, China 2 School of Astronautics, Northwestern Polytechnical University, Xi"an 710072, China . Received: 2 May 2018 Abstract. The sinking velocity of carrier-based aircraft is an important input for landing gear design, and has a great influence on the weight of the landing gear and airframe structure.

Landing impact load design is essential, but the process has rarely been fully described, and some designers have even neglected the differences between wheel-axle and ground-contact loads, as well as loads in the longitudinal direction, especially in experimental validations. In this paper, the entire design process of a nose landing gear is addressed, ...

High-precision control problems for carrier-based UAVs are challenging due to the requirements for safety, high-performance operation and uncertain ocean environments. To address such problems, this paper proposes a direct lift landing control method that can ensure the safe operation of UAVs using intelligent optimization of control performance indicators and ...

In the other researches of the catapult launch of carrier-based aircraft, the off-center catapult launch [12,13] of carrier-based aircraft can excite directional oscillations; the nose gear jump ...

In this paper, the carrier-based aircraft adopts a front-wheel drag-type ejection method. The initial eccentricity of the carrier-based aircraft is the deviation between the nose gear and the ejector slide, as shown in Fig. 1. Among them, point A is the point at which the front landing gear of the carrier-based aircraft projects onto the deck.

A: The related landing-arresting subsystem, called the Advanced Arresting Gear (AAG) sub-program, will replace the present hydraulic-ram based system and provide adjustable firmness and flexibility in managing the shock absorption and retarding of carrier"s arresting wires. It uses energy-absorbing water turbines and a large induction motor ...

A significant amount of kinetic energy is dissipated during each commercial aircraft landing. To improve energy efficiency and environmental sustainability, the kinetic energy can instead be ...

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The release load of holdback bar will affect the safety of catapult-assisted takeoff of carrier-based aircraft, and the accurate control of releasing the load will ensure success. The magnitude and the control accuracy of release load are important parameters which impact the takeoff performance, therefore unstable release load and insufficient release precision are ...

Flying an aircraft is not the simplest task but landing on the flight deck of a carrier is one of the most difficult tasks a naval pilot ever has to do. Most decks are only around 150 meters long ...

Steam launch of carrier-based aircraft is a device that converts the thermal energy of the steam into mechanical energy that can be used to power the carrier-based ...

The launch bar is a unique device of carrier-based aircraft, which is connected to the nose gear and shuttle. In order to avoid the launch bar striking the flight deck after the launch bar pops out of the shuttle, it is very important to research the dynamics performance of the launch bar. This paper establishes a staged mathematical model of catapult launch including the launch bar, a ...

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