D-FP06

Aerospace- Control 1

13:00-15:00 **Chair : Han Sung-Hyun (Kyungnam National Univ.)**
Room : 4231 **Co-Chair : Kim Youdan (Seoul National Univ.)**

13:00 – 13:20 **D-FP06-1**

Stabilizing Controller Design for Linear Time-Varying Systems Using Ackerman-like Formula

Choi Jae Weon and Lee Ho Chul
(Pusan National University)

This paper deals with the eigenvalue assignment technique for linear time-varying systems to achieve feedback stabilization. For this, we introduce the novel eigenvalue concepts. Then, we propose the Ackerman-like formula for linear time-varying systems. It is believed that this technique is the generalized version of the Ackerman formula forlinear time-invariant systems. The advantages of the proposed technique are that it does not require the transformationof the original system into the phase-variable form nor the computation of eigenvalues of the original system.

13:20 – 13:40 **D-FP06-2**

Trajectory Optimization in Consideration of Inertial Navigation Errors

Ryoo Chang-Kyung, Kim Jongju and Cho Hangju
(Agency for Defense Development)

Inertial navigation error is the major source of miss distance when only the inertial navigation system is used for guidance, and tend to monotonically increase if the flight time is small compared to the Schuler period. Miss distance due to these inertial navigation errors, therefore, can be minimized when a missile has the minimum time trajectory. Moreover, vertical component of navigation error becomes null if he impact angle to a surface target approaches to 90 degrees. In this paper, the minimum time trajectories with the steep terminal impact angle constraint are obtained by using CFSQP 2.5, and their properities are analyzed to give a guideline for he construction of an effective guidance algorithm for short range tactical surface-to-surface missiles.

13:40 – 14:00 **D-FP06-3**

Design of Neural Network Adaptive Control Law for Aircraft System Including Uncertainty

Kim Youdan and Shin Dongho
(Seoul National University)

Recently, aircraft is designed to have high maneuverable at high angle of attack. However, it is very hard to obtain the accurate dynamic model for the high performance, because aerodynamic characteristics are nonlinear and include a lot of uncertainties. Therefore, nonlinear controller without considering uncertainties may degrade the control system performance. In this paper, to overcome these defects, the neural networks based adaptive nonlinear controller is proposed making use of the backstepping technique. Neural networks are implemented to guarantee robustness to uncertainties caused by aerodynamic coefficients variation. The main feature of the proposed controller is that the adaptive controller is developed under the assumption ...

14:00 – 14:20 **D-FP06-4**

Model Reference Adaptive Control of Systems with Actuator Failures through Fault Diagnosis

Choi Jae-Weon and Lee Seung-Woo
(Pusan National University)

The problem of recongurable ight control is investigated, focusing on model reference adaptive con- trol(MRAC) through imprecise fault diagnosis. The method integrates the fault detection and isolation(FDI) schemewith the model reference adaptive control, and can be implemented on-line and in real-time. The algorithm can copewith the fast varying parameters. The Simulation results demonstrate the ability of reconguration to maintain the stability and acceptable performance after a failure.

14:20 – 14:40 **D-FP06-5**

Design of Augmented Guidance Law Considering Geometric Pursuit Angle

Kim Youdan, Kim Ki-Seok and Moon Gwan-Young
(Seoul National University)

Until now, many guidance laws have been developed. They mainly used the classical tail-pursuit guidance method based on geometric angle information, the proportional navigation method based on the line of sight(LOS) rate, and the optimal guidance law based on optimal control theorem. In the augmented guidance law, target acceleration information and autopilot characteristics are added the guidance command. In this study, new guidance laws considering geometric angle are proposed. Two guidance laws are developed for the midcourse guidance law, and a guidance law is developed for the terminal guidance respectively. The proposed guidance laws utilize the LOS rate and the geometric angle information simultaneously. In the midcourse guidance, the guidance command is ...