# I-SP05 Signal Processing

**13:00-15:00** **Chair : Ohyama Shinji (Tokyo Institute of Technology)**
**Room : C204** **Co-Chair : Doh Hyun Kim (LG INNOTEK)**

**13:00 – 13:20** **I-SP05-1**

### An Algorithmic Gray Code ADC Using Triangular function circuit

T. Pukkalanum, A. Chaikla, A. Julprapa, P. Julsereewong, A. Jaruwanawat and V. Riewruja
(King Mongkut's Institute of Technology Ladkrabang)

An algorithmic gray code analog-to-digital converter (ADC), which is based on gray coding, is proposed in this article. The realization method makes use of a MOS triangular function circuit to provide a high-speed operation and low accumulated error. The proposed ADC is simple, small in size and suitable for fabrication using a standard CMOS process. Simulation results showing the performances of the proposed circuit are also included.

**13:20 – 13:40** **I-SP05-2**

### Design and implementation of signal processing system for airborne active homing radar

Young Sung Lee, Doh Hyun Kim, and Lee Han Kim( LG Innotek),
Young Chae Kim( Agency For Defense Development)

This paper introduces the design and implementation of a signal processing system for an airborne active homing radar system. This airborne active homing radar system uses the pulse Doppler radar of high PRF (Pulse Repetition Frequency) for computation of exact relative velocity of the target. This system carries out two operations mainly. The first is to transmit and receive microwave signal through the antenna. The second is to calculate the relative velocity of the target taking advantage of the Doppler frequency signal reflected from the target and detect the angle error between a target and an antenna LOS (Line Of Sight) to make the antenna direction coincident with the target. The signal processing system has a role of the latter. ...

**13:40 – 14:00** **I-SP05-3**

### Electronically adjustable gain instrumentation amplifier

A. Julprapa, A. Chaikla, P. Ukakimaparn, J. Parnklang, S. Suphap and V. Reiwruja(King Mongkut's Institute of Technology Ladkrabang)

In this paper, an instrumentation amplifier, which the voltage gain can be electronically adjusted, is proposed. The realization method is based on the use of operational transconductance amplifiers (OTAs) as active circuit elements. The common mode rejection ratio (CMRR) of the proposed scheme is better than 93dB at the frequency of about 70kHz. The temperature effect to the circuit performance is also compensated. Experimental and simulation results demonstrating the characteristics of the proposed scheme are also included.

**14:00 – 14:20** **I-SP05-4**

### An Active-Only Voltage-Mode Integrator and Its Applications

Worapong Tangsrirat and Wanlop Surakampontorn
(ReCCIT, KMITL)

This paper presents a novel circuit configuration for realizing the continuous-time active-only voltage-mode integrator. The proposed integrator consists only of internally compensated type operational amplifier (OA) and operational transconductance amplifiers (OTAs). Since no external passive elements are required, the integrator is suitable for integrated circuit implementation in either bipolar or CMOS technologies. Moreover, the integrator gain can be electronically tuned by adjusting the bias currents of the OTAs. The characteristics of the proposed integrator and the effectiveness of the design procedure in realizing various analog transfer functions have been examined by PSPICE simulation.

**14:20 – 14:40** **I-SP05-5**

### Tracking Error Extraction Algorithm in Monopulse Active Homing Radar System

Jun-Beom Kwon, Do-Hyun Kim, and Lee-Han Kim( LG Innotek),
Young-Jin Byun( Agency for Defense Development)

Monopulse active homing radar requires velocity and angle information of target to track fast moving target. Target velocity can be estimated by measuring the frequency shift between transmitted and received frequencies. Angle information is obtained by measuring boresight error. Measurement of doppler frequency component in received signal is done through FFT analysis and interpolation algorithm for fine tuning. Boresight errors in azimuth and elevation axes are proportional to the power of each difference channel relative to sum channel. The target signal power in difference channel is estimated more precisely by measuring the power of FFT result cell of maximum ...

**14:40 – 15:00** **I-SP05-6**

### Analysis of Inspection Ability of Panel Using BMPC Method

F.Toriumi, J.Takayama, S.Ohyama and A.Kobayashi
(Tokyo Institute of Technology)

A band function model paired comparison(BMPC) method is a kind of paired comparison methods. Considering that human has ambiguity, the BMPC method uses a monotonous increase function with the width as the human judgment characteristic. Since panel's judgments do not always have enough response, it is very important to examine inspection abilities of each panel. In this study. We focus on the difference of band functions in each panel, which is the characteristic function of judgment in the BMPC method, and examine the method of obtaining panel's inspection abilities. Three kinds of evaluation functions, "the dispersion of judgments", "the resolution", and "the difference of the judgments" are defined from Panel's characteristic function of..