BOOK OF ABSTRACT

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Contents

On the Promotion in North Kinki Region and the Role of Maizuru KOSEN

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Abstract: Currently, the decline of Japan's population and the birthrate have been making the society of aged people, and the government is working on regional revitalization.

The population is decreasing in the Kita Kinki region as well, and 5 cities and 2 towns in Kita Kinki (Maizuru City, Ayabe City, Fukuchiyama City, Miyazu City, Kyotango City, Ine Town and Yosano Town) have been responding individually or in collaboration.

The following are considered necessary to become a sustainable region for the future.

1) Build a system that can solve various problems by themselves

2) Increasing the income of the people who live in the region by promoting local industry

It is described that domestic and overseas cases and the way of thinking of regional promotion, the current situation of the Kita Kinki region from the viewpoint of regional economic flow analysis, the implementation activities of the water level monitoring system by Maizuru KOSEN, , and startup methodologies related to SDGs.

Key words: aging society with a declining birthrate, Kita Kinki region, regional economic circulation analysis, small river water level monitoring system, SDGs, Startup

The Project AMATERAS (Advanced Massive Architecture of Technology, Education and Research Accelerating System) to Construct IT Platform

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Abstract: The project AMATERAS is aimed to design, develop, and manufacture high-performance compact general-purpose PCs as devices that support IT infrastructure, in order to continuously supply IT devices that support the IoT society in Japan for the future.

  This paper describes the current state of small PCs in Japan and overseas, the concept of IT platforms in Japan, the five steps of project AMATERAS, human resource development, distance learning, systems for activities, and publicity.

  The spread and deployment of the developed small PC will enable stable activities in education, industry, and research. In addition, by conducting training programs for human resource development from young people such as elementary and junior high schools, high schools, vocational schools, and technical colleges. Through these activities IT engineers who will support the next generation can be developed.

Key words: small high-performance PC, IoT, SOCIETY5.0, domestic stable supply, sustainability,
             human resource development

ON/OFF Pattern Decision of Three Dimensional Lighting System Using a Calculation Model

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Abstract: In this paper, we propose an ON/OFF pattern decision method for a three-dimensional lighting system. The three-dimensional lighting system is composed of multiple LED lighting units that can be arranged in the space. Each LED lighting unit is placed in a box created by dividing the space into grids. This discretized model is called a calculation model. We introduce a virtual network model to communicate the excess and deficiency of illuminance. The ON/OFF patterns are determined to supply an illuminance distribution similar to a desired one.

Figure 1 shows an example of the desired illuminance distribution. There are two bright areas. The displayed illuminance is normalized between [0, 1]. Figure 2 shows the ON/OFF pattern obtained by the proposed algorithm. The LED lights are turn on in two areas corresponding to the bright area in Fig. 1.

Key words: Illuminance distribution, Three-dimensional lighting system, ON/OFF pattern, Optimization
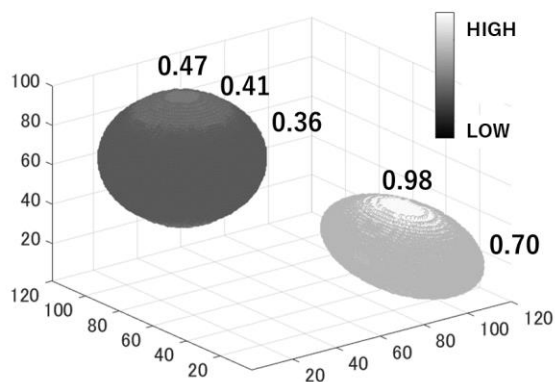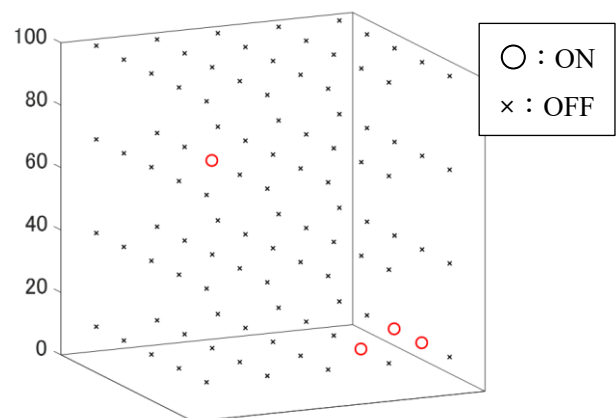
Fig.1 Desired illuminance distribution

Fig.2 ON/OFF pattern obtained by proposed algorithm

istribution of Forming Characteristics in Pt/NiO/Pt stack structures

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Abstract: An abrupt reduction in resistance called forming is required for resistance switching phenomenon in ReRAM structures using a binary oxide such as nickel oxide (NiO). In this study, dependence of the forming characteristics on applied voltage, cell size, and ambient temperature were investigated under constant voltage stresses to Pt/NiO/Pt stack structures. Many experimental results suggest that the formation of conductive filaments at forming follows a weakest link theory, and that weakest spots are randomly distributed in the NiO film according to the Poisson statistics. Moreover, at a high temperature of 400K, gradual reduction phenomena in resistance were observed before the forming process, which indicates that defects in the ultrathin layer in the NiO can occur continuously due to electrical stress as the ambient temperature elevate. What temperature the phenomenon becomes apparent should be clarified in the near future.

Key words: resistive switching, nickel oxide, forming

A report on Japanese classic class comparing various Urashima legends:
The practice of face-to-face classes and remote classes

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Abstract: This paper reports on practices of Japanese classic classes that compare aspects of acceptance of the Urashima legend. It is based on three years of face-to-face classes from 2017 to 2019 and remote classes in 2020. The purpose of this paper to review the meaning of Japanese classic classes and to show the possibility in remote classes.