

External Awards

Certificate of Appreciation

Winner: Minoru Inomata, NTT Access Network Service Systems Laboratories

Date: August 31, 2022

Organization: The Institute of Electrical and Electronics Engineers (IEEE)

For serving as a Technical Program Committee member at the 2022 IEEE International Workshop on Electromagnetics: Applications and Student Innovation Competition (iWEM 2022).

Distinguished Contributions Award

Winner: Shuto Yamamoto, NTT Network Innovation Laboratories

Date: September 7, 2022

Organization: The Institute of Electronics, Information and Communication Engineers (IEICE) Communications Society

For contribution as an associated editor in the editorial committee of IEICE Communications Express.

Contribution Award

Winner: Junko Takahashi, NTT Social Informatics Laboratories

Date: September 7, 2022

Organization: IEICE Technical Committee on Hardware Security

For contribution to the operation and activities of the Technical Committee on Hardware Security.

Papers Published in Technical Journals and Conference Proceedings

Nonlinear Time-frequency Analysis of Lightning Strike Surge Current Waveforms Recorded at Gasing Hill, Kuala Lumpur

F. Ishiyama and M. Maruyama

IEEE 18th International Colloquium on Signal Processing & Applications (CSPA 2022), Selangor, Malaysia, May 2022.

We are investigating countermeasure technique against electromagnetic noise on telecommunication-related equipment, and we have developed a method of nonlinear time-frequency analysis for the purpose. We applied this method to the analysis of lightning strike surge current waveforms. Such waveforms produce highly nonlinear transient time series, and we have revealed their nonlinear characteristics. The relaxation process of these waveforms begins with an oscillating region with an extremely large decay rate, and is followed by a non-oscillating region with a nonlinearly increasing decay rate.

found that the time-frequency characteristics obtained with our method are fairly stable. Therefore, the characteristics represent a possible candidate for a noise fingerprint under such interdependent condition.

Nonlinear Time-frequency Analysis of Nonlinearly Coupled Electromagnetic Noise Sources

F. Ishiyama and M. Maruyama

CSPA 2022, Selangor, Malaysia, May 2022.

We are investigating countermeasure techniques against electromagnetic noise on telecommunication-related equipment, and we have developed a method of nonlinear time-frequency analysis for the purpose. We are looking for a noise fingerprint signature, which is stable under nonlinearly coupled conditions with surrounding noise sources through power line. We considered such a case, and

Visually Equivalent Light Field 3-D for Portable Displays

M. Date, S. Shimizu, and S. Yamamoto

IEEE Transactions on Industry Applications, Vol. 58, No. 5, pp. 5659–5666, September/October 2022.

Highly realistic 3-D displays that can reproduce object images to look like physical objects are utilized for natural and correct remote operation in industrial scenes. Therefore, we developed a visually equivalent light field 3-D (VELF3D) display that can produce highly realistic, accurate images with a high resolution and a smooth, accurate motion parallax. However, the observation distance is slightly long, and users cannot reach the displayed images. Therefore, we aim to develop a tablet-computer-type VELF3D display that enables users to touch the displayed objects. The display viewpoint density has been increased to achieve a shorter observation distance, while maintaining the display depth range. Because higher resolutions are required for a close observation distance and increased display viewpoints, we aimed to improve the effective resolution using almost the same pixel pitch display panel. Therefore, we built a prototype that combines a vertical red, green, blue stripe display panel and a parallax barrier with subpixel width slits. We confirmed effective resolution improvement by tiny subjective tests. This method also helps

increase the depth range of the display when it is observed from a normal distance.
