国際会議「NOLTA2012」参加および発表報告

工学研究科博士前期課程総合工学専攻電気電子工学コース 2 年　中島　良太

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This is the report which I had a presentation at the 2012 International Symposium on Nonlinear Theory and its Applications. Firstly, I would appreciate for the financial help from the program of "Institutional Program for Young Researcher Overseas Visits" of JSPS. And also, I would appreciate for Nagasaki University for giving me a chance to visit the conference

１．国際会議の概要

Nonlinear Theory and Its Applications, IEICE (NOLTA) is a journal published quarterly by the Institute of Electronics, Information and Communication Engineers (IEICE), and edited by the NOLTA Editorial committee. NOLTA covers the entire field of nonlinear science, engineering and mathematics. The conference held in annually in each year. And, in 2012, it was held at Palma de Mallorca, as the 2012 International Symposium on Nonlinear Theory and its Applications (NOLTA2012). This is the 22nd NOLTA. Since the 1st NOLTA in 1991, NOLTA has been held in Japan, USA, Switzerland, Germany, China, Belgium, Italy, Canada, Hungary and Poland.

２．発表内容と成果

Fig. 1 At the presentation.

Because of technical advantages and diversifications of electronic devices, power supplies with high-efficiency and low noise are required to realize energy-saving society. As one of the key technologies to reduce loss of energy in the circuit, switching power supplies are proposed. Although the switching power supply which is controlled by semiconductor switching devices regulates the output voltage to use various loads efficiency, it behaves like chaotic oscillation if particular parameters are introduced into the circuit. Then, the switching power supply becomes

unstable. To inspect such a behavior, we implement the switching power supply and evaluate it. In this paper, we performed numerical simulations and demonstrated experiments because we study whether or not the current-mode controlled DC-DC buck-boost converter show chaotic behavior. From the experimental results, we could be confirmed that reactor current and output voltage oscillation does not regularly and show complex behavior when the input voltage fluctuated.

After the presentation, I had some questions from audience. One is about the stability of the system and one is about the circuit topology.

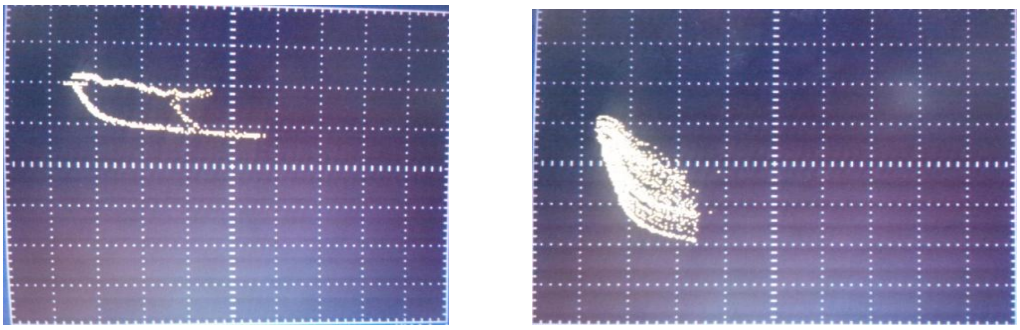

Fig. 2 Measurement results of Chaotic oscillation with Experimental Circuits: H:200mV/div. V:5V/div.

３．今後の展望と感想

As future work, we will evaluate circuit model that subjected to setting more realistic in numerical simulations. Also, in this demonstrated experiments, sometime a peak current of the reactor current couldn’t be controlled when input voltage increased. Therefore, we will improve demonstrated experiments of the circuit and compare numerical simulations and demonstrated experiments in the current-mode controlled DC-DC buck-boost converter. In addition, based on the evaluation of these, we will examine about output stabilization for chaotic phenomena appearing in the circuit.