Wireless power feed system with an electromagnetic resonance field

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Keywords	Electromagnetic wave, Application of sensor and microcomputer.		
Technical Support Skills	· Electromagnetic field analysis · Measurement of electromagnetic properties of dielectric · Seminar of sequential control for beginners		

Research Contents — Wireless power feed system with an electromagnetic resonance field

Recently, it is so active to develop and research of a wireless power transfer system. Main wireless power Transfer system has been an application of electromagnetic induction or microwave. These are too restrictive to use for power transfer because the distance of power transfer is several cm. In 2007, Marin Soljacic' group in MIT showed a new type of Wireless power feed system using a Magnetically Coupled Resonators. He succeeded in long distance transmission in meter order.

In this study, we made an experimental system using an electromagnetic resonance field and examined performance of the system. We also analyze electromagnetic field around the experimental system. Constructing the experimental system and the computational model corresponding to the system, we will improve the experimental system and the computational model efficiently.

The experimental system is shown in fig.1. The system consisted of a pair of circle coils shown in Fig.2. As for this simple experimental system, we measured the S-parameters with a network analyzer and calculated the properties of this system. We used WIPL-D for computing EM fields. We made the computational model in Fig.2 and also compared results of the experiment system with the computation model to improve this computational model.

In our laboratory, we have continued analysis of the electromagnetic field propagation using the FD-TD method as well as a commercial package such as WIPL-D. Because it is easy to program a computational mode for FD-TD method, we can evaluate the propagation of electromagnetic wave such as Fig.3 easily. It is difficult to apply the FD-TD method to the experiment environment such as the above problem directly. But now FD-TD method has been improved, we would like to apply the improved method to this problem.

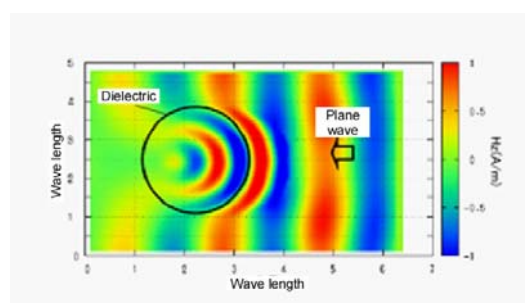Fig. 1 experimental system

Fig. 2 Computational model

Fig. 3 Calculated wave propagation in TM mode

Available Facilities and Equipment

Agilnent Technologies Network Analyzer (N5320A)	

KOSEN SEEDS