Faculty of
Science and
Technology
Tokushima University

Modeling of Dynamical Brain Networks by Coupled Oscillatory Systems
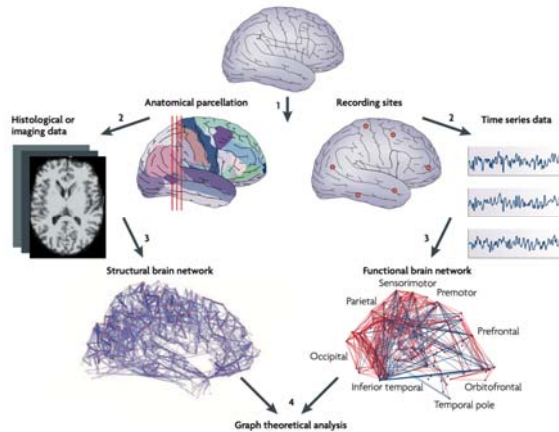## Associate Professor Yoko Uwate
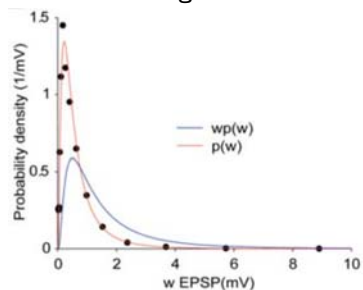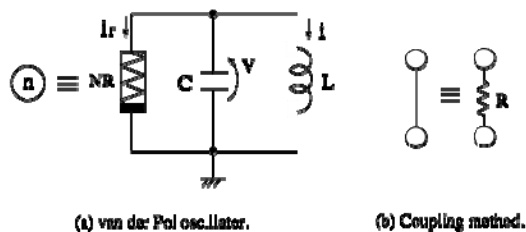

Fig. 1 Structural and functional brain networks

Fig. 2 Heavy tail distribution

Fig. 3 van der Pol oscillator

Fig. 4 Brain network model
of macaque visual cortex

Fig. 5 Global synchronization

Content:

1 Introduction

Recently, structural and functional brain network have been made clear (Fig. 1). And, several research group have reported that the synaptic connection has heavy tail distribution as shown in Fig. 2. In this project, we investigate synchronization of brain network model of macaque visual cortex with heavy tail coupling distribution.

2 Proposed system and results

Figure 4 shows brain network model of macaque visual cortex. the node of network model is expressed by van der Pol oscillator (Fig. 3). Figure 4 shows the simulation results of global synchronization. The network with heavy tail distribution synchronized to avoid global synchronization.

3 Future works

Investigation of more large brain network and make clear the relationship between synchronization and high-function of brain are our future works.

Keywords：coupled oscillators, synchronization,
clustering

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