

# 「Orthogonal AMP: a new approach to a classical estimation problem」

講演者: Professor Li Ping  
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場所: 情報科学系講義棟 大講義室

## 講演要旨:

Bayesian-optimal signal estimation is usually NP-hard in many practical systems. The modern turbo detection principle approaches the problem by operating iteratively between two local detectors. This is also referred to as message passing, in which messages are required to be extrinsic, meaning that the errors at the input and output of a local detector should be independent. Such independence avoids the correlation problem during the iterative process. The turbo principle has found wide applications in communication and signal processing systems.

An interesting question is: can we do better than turbo?

The answer is affirmative. In this talk, we will outline an orthogonal AMP (OAMP) principle inspired by the recent advent of approximate message passing (AMP). OAMP requires the input/output errors to be un-correlated only, which is a more relaxed constraint than the independence requirement in the turbo principle. Such relaxation implies that local detectors can provide more information in their outputs and so enhances global performance. Compared with AMP, OAMP can be applied to a wider family of system environments. We derive a state-evolution (SE) procedure to characterize the performance of OAMP. We conjecture that this SE procedure is accurate and we are working on a proof for this conjecture. Under this conjecture, we show that OAMP can potentially outperform turbo under certain standard assumptions for iterative decoding. We will verify the advantages of OAMP using simulation results.

## 講演者略歴:

Prof. Li Ping received his Ph.D. degree at Glasgow University in 1990. He lectured at Department of Electronic Engineering, Melbourne University, from 1990 to 1992, and worked as a research staff at Telecom Australia Research Laboratories from 1993 to 1995. Since January 1996, he has been with the Department of Electronic Engineering, City University of Hong Kong, where he is now a chair professor of information engineering. Prof. Li Ping received the IEE J J Thomson premium in 1993, the Croucher Foundation Award in 2005 and a British Royal Academy of Engineering Distinguished Visiting Fellowship in 2010. He served as a member of the Board of Governors for IEEE Information Theory Society from 2010 to 2012 and is a fellow of IEEE.