

國立東華大學應用數學系  
應數講座

主講人：吳建銘教授

國立東華大學應用數學學系

講題：Two-lead fetal ECG separation based on nonlinear  
convolution modeling of Potts Perceptrons

時間：102 年 04 月 03 日 (星期三) 11:20-11:50

地點：理工一館 A324 會議室

摘要

Fetal ECG separation aims to extract source signals oriented from activities of fetal heart subject to multi-channel maternal observations. Typical maternal ECGs contain eightchannel observations, which have been processed by unsupervised learning in the field of neural networks for blind separation of fetal ECGs. This talk presents independent component analysis based on annealed KLD minimization and demonstrates its applicability for fetal ECG separation. Blind separation of fetal ECGs is further explored based on supervised learning following the idea of nonlinear convolution modeling, extended from linear convolution, which contains cascaded linear and post-nonlinear structures. Potts perceptrons have been shown more general than typical perceptrons. Each Potts perceptron has  $K$  internal states. When  $K=2$ , it reduces to the two-state perceptron. Neural organization of multilayer Potts perceptrons and LM (Levenberg-Marquardt) learning have been recently proposed. Multilayer Potts perceptrons are applied for nonlinear convolution modeling and resolving fetal ECG separation subject to two-lead observations respectively measured nearby physical positions of maternal and fetal hearts. Numerical simulations of fetal ECG separation subject to two-channel observations are given to verify the effectiveness and reliability of the proposed nonlinear convolution modeling.

※※※ 歡迎參加 ※※※ se1020403