

| | |
|--------|--|
| 科目代碼 | AM_32800 |
| 科目名稱 | 智慧型數值計算 |
| 授課老師 | 吳建銘 |
| 開課班級 | 研究所 |
| 每週授課時數 | 3 |
| 校內分機 | 3531 |
| 教師電子郵件 | jmwu@mail.ndhu.edu.tw |
| 教師辦公室 | 理 A426 |
| 會談時間 | |
| 課程助教 | 無 |
| 助教電子郵件 | |
| 助教工作項目 | |

課程目標

This course introduces intelligent numerical computations. The topics mainly include supervised learning of advanced multilayer neural networks, unsupervised learning for independent component analysis, blind signal and image de-convolution, blind source separation, and hybrid learning for density approximation, density support approximation, chaotic time series approximation and chaotic time series clustering. Advanced research topics, including set-value mapping approximation, dimensionality reduction, associative memory and Markov-chain embedded recurrence relation approximation, will be also introduced.

| | |
|------|--|
| 教學方法 | Lectures and matlab programming exercises |
| 教學評量 | Midterm 30%+Final 40%+ Exercise 30% |
| 課堂教材 | Textbook and lecture slides |
| 其他教材 | Jade ICA, Kohonen self-organizing algorithm, K-means, NNSID and radial basis function MATLAB Package |
| 作業備註 | |
| 其他標題 | |
| 其他內容 | |

| 週次 | 進度 | 重要事項 |
|----|---|------------|
| 1 | Advanced multilayer neural networks (I) - Multilayer Potts Perceptrons versus multilayer perceptrons | |
| 2 | Advanced multilayer neural networks (II) - Mahalanobis-NRBF Modules versus RBF modules | |
| 3 | Supervised learning, unsupervised learning, and hybrid learning | |
| 4 | PCA, clustering, SOM and JadeICA | |
| 5 | Independent component analysis: PottsICA | Exercise 1 |
| 6 | Fetal ECG analysis, ERP and EEG analysis | |
| 7 | Independent component analysis based on weighted Parzen windows | |
| 8 | Covariance matrix analysis and covariance matrix decomposition | |
| 9 | Convolutive ICA and blind source separation | |
| 10 | Blind signal deconvolution and blind image deconvolution | |
| 11 | Time series clustering, chaotic time series clustering | |
| 12 | Chaotic time series analysis | Exercise 2 |
| 13 | Classification | |
| 14 | Set-valued mappings, system inverting | Exercise 3 |
| 15 | Density approximation and density support approximation | |
| 16 | Dimensionality reduction | Exercise 4 |
| 17 | Sudoku, TSP, and Associative memory | |
| 18 | Markov-chain embedded recurrence relation approximation | |