



# Tensor Decompositions: A New Concept in Brain Data Analysis?

Andrzej Cichocki

(Submitted on 2 May 2013)

Matrix factorizations and their extensions to tensor factorizations and decompositions have become prominent techniques for linear and multilinear blind source separation (BSS), especially multiway Independent Component Analysis (ICA), Nonnegative Matrix and Tensor Factorization (NMF/NTF), Smooth Component Analysis (SmoCA) and Sparse Component Analysis (SCA). Moreover, tensor decompositions have many other potential applications beyond multilinear BSS, especially feature extraction, classification, dimensionality reduction and multiway clustering. In this paper, we briefly overview new and emerging models and approaches for tensor decompositions in applications to group and linked multiway BSS/ICA, feature extraction, classification and Multiway Partial Least Squares (MPLS) regression problems. Keywords: Multilinear BSS, linked multiway BSS/ICA, tensor factorizations and decompositions, constrained Tucker and CP models, Penalized Tensor Decompositions (PTD), feature extraction, classification, multiway PLS and CCA.

Subjects: **Numerical Analysis (cs.NA)**; Learning (cs.LG); Neurons and Cognition (q-bio.NC); Machine Learning (stat.ML)

Journal reference: Control Measurement, and System Integration (SICE), special issue; Measurement of Brain Functions and Bio-Signals, 7, 507-517, (2011)

Cite as: **arXiv:1305.0395 [cs.NA]**  
(or **arXiv:1305.0395v1 [cs.NA]** for this version)

## Submission history

From: Andrzej Cichocki [[view email](#)]  
[v1] Thu, 2 May 2013 11:17:47 GMT (782kb)

[Which authors of this paper are endorsers?](#)

## Download:

- [PDF](#)
- [PostScript](#)
- [Other formats](#)

## Current browse context:

cs.NA

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1305](#)

## Change to browse by:

cs

[cs.LG](#)

q-bio

[q-bio.NC](#)

stat

[stat.ML](#)

## References & Citations

- [NASA ADS](#)

## DBLP - CS Bibliography

[listing](#) | [bibtex](#)

[Andrzej Cichocki](#)

## Bookmark (what is this?)

