# SUPERVISOR MODULE

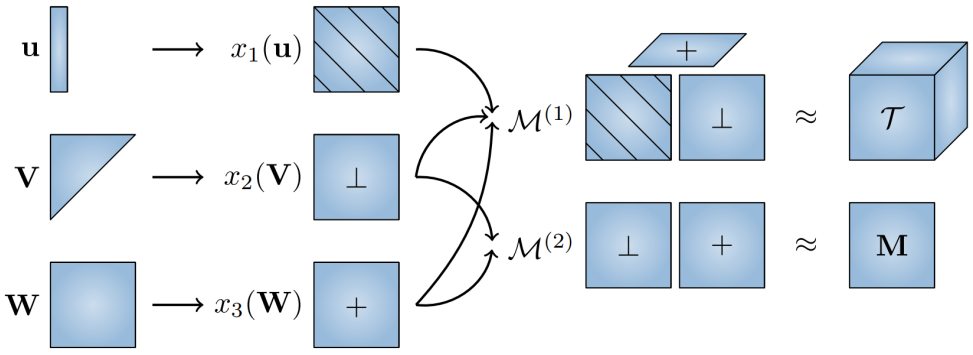


# STRUCTURED DATA FUSION FOR IMPLICITLY GIVEN MATRICES AND TENSORS

Details Studenten

Structured data fusion (SDF) concerns the joint decomposition of several matrices and/or tensors, which may share (part of) their structure or underlying generators. Moreover, the decompositions may be subject to constraints, such as orthogonality or nonnegativity, which reflect known properties of data components. SDF is important in increasingly many modern applications, such as multimodal data analysis in biomedical applications (e.g. EEG/fMRI), integration of different types of microscopy and spectroscopy, integration of different sources of social network data, etc.

Tensorlab is an in-house developed Matlab toolbox that comprises numerically reliable and efficient algorithms for the computation of tensor decompositions (www.tensorlab.net). Since version 2.0 it also offers extensive tools for SDF, including a Domain Specific Language (DSL) with which the user can specify the type of decompositions, constraints and ways of coupling.




The goal of this thesis is to extend SDF to settings in which the matrices and tensors are not given as such. Indeed, in modern large-scale applications there may just be “too much to measure” and one needs to process matrices and tensors that have been observed only partially. Also, the measurement device may have introduced some distortion. Such extensions can be mathematically captured by assuming that the matrix or tensor satisfies a set of linear equations; in compressed sensing scenarios this set of equations is underdetermined but the model structure can be exploited to find a unique solution.

**Bijlagen**

**Bijlage toevoegen (<30MB)**

Browse... No file selected.

**VOEG TOE**

| Promotoren | Co-promotoren | Mentors | Assessoren |
|---|---|---|---|
| Lieven De Lathauwer | | | |

**Project URL**

(leeg)

**Naam organisatie / URL**

(leeg)

**Opmerkingen**

The required know-how w.r.t. tensor methods is acquired through discussions, attending a few lectures and a limited, guided study of the literature. A concise course text is available. New algorithms are developed with attention for numerical aspects. The algorithms are validated on synthetic examples and real-life data.
Depending on the interest, the emphasis can be put less or more on numerical aspects, implementation or applications. The algorithms may eventually become part of Tensorlab.

Wiskundige ingenieurstechnieken

Mathematical Engineering

| Status |
|---|
| ontwerp |
| 2025-03-05 20:31:55 |

**Status**

**Laatst gewijzigd door**

Lieven De Lathauwer

**Disciplines**

NUMA

STADIUS

**Embargo**

**Aantal studenten**

1 - 2

‹ **OVERZICHT ONDERWERPEN**