The Structure of Graph Product Operator Algebras

A Data Management Plan created using DMPonline.be

Creator: Mario Klisse

Affiliation: KU Leuven (KUL)

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Project abstract:

Being part of Voiculescu's groundbreaking non-commutative probability theory, free products of operator algebras are ubiquitous in the theory of operator algebras. They can be viewed as a natural operator-algebraic analogue to free products of groups where both constructions are in a certain sense compatible with each other. In the group setting free products can be generalized in terms of Green's graph products of groups. Inspired by this, Caspers and Fima introduced a suitable operatoralgebraic analogue of graph products. Their construction associates with a simplicial graph with C*-algebras (or von Neumann algebras) attached to each vertex, a new C*-algebra (or von Neumann algebra) into which the vertex operator algebras canonically embed and for which the commutation relations resemble the structure of the underlying graph. It generalizes both Voiculescu's free products and tensor products, covers interesting examples (such as right-angled Hecke operator algebras), and admits desirable stability properties.

Being highly non-trivial, since the late 1980s free products of operator algebras have been studied a lot. Much less is known about graph products of operator algebras. Motivated by that, the proposed project aims at broadening the knowledge of the structure of graph product operator algebras with a particular emphasis put on their ideal structure, the (preservation of) approximation properties, and the structure of (right-angled) Hecke operator algebras.

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FWO DMP (Flemish Standard DMP)

1. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

				Only for digital data	Only for digital data	Only for digital data	Only for physical data
Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume
Notes	The notes I will be writing during meetings and during the production of the final manuscripts.	Generate new data	both digital and physical	Other	.tex, .bib, .docx, .lyx	<1GB	Some sheets of paper.
Manuscripts	Once "Notes" have been polished for publication, they become a manuscript that contains my research findings.	Generate new data	both digital and physical	Other	.tex, .bib., .docx	<1GB	NA

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

No data will be reused.

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- No

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- No

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.

- No

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements/ research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

2. Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g., in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded).

All the information to keep the data understandable is contained in the text of the corresponding publications. The metadata that facilitate the usability is per the publishing bodies' requirements (those of, e.g., LIRIAS, arXiv, journals) and includes the standard bibliographical information together with the unique digital identifier DOI.

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- Yes

The metadata standard is inherited from the publishing body (e.g., LIRIAS, arXiv, journals).

3. Data storage & back-up during the research project

Where will the data be stored?

The data "Notes" will be stored as follows:

- Physical notes are stored in the desk drawer of my office in the KU Leuven Mathematics department.
- Digital notes are stored on the digital facilities (servers) of the KU Leuven and via the cloud editor overleaf.com.

"Notes" transition into "Manuscripts" by being uploaded to arXiv.org, an open-access archive for mathematical work, where the manuscript remains freely accessible indefinitely. They will further be deposited in LIRIAS, in accordance with the FWO requirements, and submitted to journals for publication.

How will the data be backed up?

"Notes" do not need to be backed up, as their relevance is very short lived and as they are reproduceable. Virtual copies of "Manuscripts" will be kept on a local hard drive, in the cloud (overleaf.com, OneDrive through KU Leuven) and per the policies of the publishing bodies (e.g., LIRIAS, journals, arXiv). The redundancy principle guarantees the preservation of the data.

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely.
If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.

- Yes

The data is represented digitally in the form of text and formulas typset in LaTeX. Hence the resulting files do not require much storage capacity (average file size is 1MB), and the existing storage and backup capacities are more then sufficient.

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

The data does not contain any sentivie information. However, all digital data is stored in online accounts (on overleaf.com, DropBox.com, OneDrive through KU Leuven, LIRIAS, arXiv) and on devices (laptop provided by SET-IT; personal laptop) that are password protected. All physical data is stored in my locked office in KU Leuven's Mathematics department.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

There will be no costs associated to data storage and backup.

4. Data preservation after the end of the research project

Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

Notes will have lost their value after five years and will therefore not needed to be retained. Manuscripts will be retained on arXiv, LIRIAS, and at the publishing journals indefinitely, i.e., beyond five years after the project has ended.

Where will these data be archived (stored and curated for the long-term)?

Notes will not be archived. The data will be archived on the servers of KU Leuven (LIRIAS), arXiv, and of the other publishing bodies.

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

The data preservation bears no costs for the project.

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in an Open Access repository
- Yes, in a restricted access repository (after approval, institutional access only, …)
- No (closed access)

My notes are only for my personal use during the production of manuscripts, whereas manuscripts will be made available on the open-access preprint server arXiv, on LIRIAS, and at the publishing journal.

If access is restricted, please specify who will be able to access the data and under what conditions.

My notes will never be made available to the public, as it is for my own use. The access of the data that is not for my personal use (i.e., of manuscripts) will not be restricted.

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain in the comment section per dataset or data type where appropriate.

- No

Where will the data be made available? If already known, please provide a repository per dataset or data type.

My notes will never be made available to the public. The final manuscripts will be made available via arXiv, LIRIAS, and at the publishing journals.

When will the data be made available?

Upon publication of research results. The results in a form of preprints will be first available through arXiv.

Which data usage licenses are you going to provide? If none, please explain why.

Does not apply to my notes.

Manuscripts on arXiv are either under "CC BY 4.0" or under "arXiv.org perpetual, non-exclusive license to distribute this article (Minimal rights required by arXiv.org) ".

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- Yes

DOI is provided automatically by the publishing body.

What are the expected costs for data sharing? How will these costs be covered?

There are no costs for data sharing.

6. Responsibilities

Who will manage data documentation and metadata during the research project?

Mario Klisse, to the extent it is applicable

Who will manage data storage and backup during the research project?

Mario Klisse, to the extent it is applicable

Who will manage data preservation and sharing?

Mario Klisse, to the extent it is applicable

Who will update and implement this DMP?

Mario Klisse, to the extent it is applicable