Plan Overview

A Data Management Plan created using DMPonline

Title: xDEA - Vibro-acoustic energy flow in hybrid systems: improving the simulation of engineering structures

Creator: Martin Richter

Principal Investigator: Gregor Tanner

Data Manager: Martin Richter, Gregor Tanner, Matthew King

Project Administrator: Gregor Tanner

Contributor: Martin Richter, Matthew King

Affiliation: University of Nottingham

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ORCID iD: 0000-0001-5756-274X

Project abstract:

The xDEA project will address this industrial capability gap by developing a new simulation framework that combines state-of-the-art experimental methods from Transfer Path Analysis and the cutting-edge high frequency simulation using Dynamical Energy Analysis (DEA). DEA will be extended by developing inputs for experimental data representing components that cannot be easily modelled. On the experimental side, xDEA will develop new techniques able to characterise complex components at mid-to-high frequencies.
Capturing directional information, such as energy flow / intensity, using optical techniques will be the key innovation here. This information is crucial for high frequency simulations. Together, these innovations will provide a robust vibro-acoustics sThe xDEA project will address this industrial capability gap by developing a new
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xDEA - Vibro-acoustic energy flow in hybrid systems: improving the simulation of engineering structures

Data Collection

What data will you collect or create?

The data created in Nottingham will consist of simple FEM models for the objects we want to describe (simple plate assemblies) as well as the resulting numerical results (FEM and DEA results). The file format for the former will be `bdf' [1] files, the file format for the latter mainly `vtk' files [3]

Furthermore, the project will provide documentation and slides for presentations in form of `pdf' files.

[1] The `bdf' (Bulk Data File) is an ASCII format describing structural problems. It was introduced and is used by the software NASTRAN [2]. The format can be read by [Gmsh] (<https://en.wikipedia.org/wiki/Gmsh>), for example.

[2] Nastran is a FEM solver for structural problems, see [wikipedia] (<https://en.wikipedia.org/wiki/Nastran>) for a historical overview. One of the main current commercial vendors is [Hexagon] (<https://en.wikipedia.org/wiki/Hexagon_AB>) via [MSC Software] (<https://en.wikipedia.org/wiki/MSC_Software>).

[3] The `vtk' (Visualization Tool Kit) file format exists in different flavours. We will be using the legacy ASCII format. For further information see [VTK] (<https://en.wikipedia.org/wiki/VTK>) and [the documentation on legacy file formats] (<https://docs.vtk.org/en/latest/vtk_file_formats/vtk_legacy_file_format.html>)

How will the data be collected or created?

Data will be computed following the DEA algorithm outlined in the literature using an in-house `C++' code.

Documentation and Metadata

What documentation and metadata will accompany the data?

Documentation will be provided in terms of pdf files describing the data together with small example scripts (python) showing how to read and display the data.

Ethics and Legal Compliance

How will you manage any ethical issues?

There are none to our knowledge.

How will you manage copyright and Intellectual Property Rights (IPR) issues?

Copyright & IPR for all project research data is owned by University of Nottingham.

Storage and Backup

How will the data be stored and backed up during the research?

We will use The University of Nottingham provided storage for our working data. The University of Nottingham licenses Microsoft Teams, allowing for secure and controlled sharing of data among the research team. Microsoft Teams encrypts data both in transit and at rest and is approved against the University’s Handling Restricted Data Policy. The service provides several layers of automatic back up and, in a disaster scenario, files can be recovered. Access to data stored in MS Teams is via secure log-in with multi-factor authentication.

How will you manage access and security?

See above

Selection and Preservation

Which data are of long-term value and should be retained, shared, and/or preserved?

We will retain data underlying publications for reproducibility.

What is the long-term preservation plan for the dataset?

All data will be managed according to the University of Nottingham’s data management policy to ensure that all research data be managed in a manner that supports its authenticity, reliability, security, discoverability and, where appropriate, accessibility for re-use.

In particular, we will use the Nottingham Research Data Management Repository (<https://rdmc.nottingham.ac.uk/>) which will provide a DOI for the published data for easy retrieval.

The University of Nottingham will retain and preserve research data in line with the University of Nottingham and Advanced Maths Support Programme requirements for a minimum of 7 years, but data will be retained for longer periods of time where it is of continual value to users.

Data Sharing

How will you share the data?

All data will be managed according to the University of Nottingham’s data management policy to ensure that all research data be managed in a manner that supports its authenticity, reliability, security, discoverability and, where appropriate, accessibility for re-use.

In particular, we will use the Nottingham Research Data Management Repository (<https://rdmc.nottingham.ac.uk/>) which will provide a DOI for the published data for easy retrieval.

Are any restrictions on data sharing required?

No.

Responsibilities and Resources

Who will be responsible for data management?

All three project members above will be responsible.
Matthew King as PDRA will create and upload the data.
Martin Richter and Gregor Tanner as PI and Co-I will ensure compliance with this DMP.

What resources will you require to deliver your plan?

The storage facilities (up to 50 GB) will be provided by the University of Nottingham via the

Nottingham Research Data Management Repository can be found here: <https://rdmc.nottingham.ac.uk/>.