The evolution of FRAM tools and the future needs / requirements

FRAM's trip from paper-and-pencil to 3D digital

Scope and objectives

Early days of FRAM were essentially a paper-and-pencil, trial and error based exercise. Theoretical foundations provided yet little guidance to modelling and even the description of functions often seemed an unachievable task that may have scared way those less given to persistence or curiosity.

The need for some support to manage data rapidly emerged in FRAM development efforts, and ideal solutions pointed to some combination of a systematic function description and a visualization support. While the use of spreadsheet proved useful, eventually efforts were devoted to more graphical and dynamic solutions.

The clarification of theoretical foundations and model development stages surely contributed to an increase in FRAM applications but the production of significantly more robust IT support seems to have boosted FRAM development in many different ways.

This proposal aims to produce a discussion around the evolution of tools that so far have been used in the application of FRAM, based on the outlining of the main types of outputs that these tools have produced and their added value towards the uppermost intent of understanding system interdependencies and sources of variability. Through an overview of what has been so far achieved and on what type of support, this discussion is expected to provide guidance for the continuous improvement of tools for FRAMing.

Notes from discussion

A spreadsheet was prepared in advance of the workshop to provide an overview of how the tools supporting the use of FRAM have evolved. In addition to gathering feedback on current FMV and potential improvements for its enhanced future use, the focus of the intended discussion was also to seek better understanding of how such tools may have impacted on the type of applications and the "depth" of work produced through the use of FRAM.

While these were obviously ambitious objectives for the time available, some observations relevant to the objectives can be made as a summary of discussion undertaken:

- In general, the tools supporting the use of FRAM have contributed to significant progress towards a more structured and systematic use of FRAM.
- While the visualisation of functions and their instantiations are certainly useful, the use of spreadsheet formats for the description of functions and their aspects seem to have had a much more significant impact in FRAM application. The systematisation of the description of functions and their aspects seems to be more valued than the actual ability to visualise the system, which is aligned with the principles of FRAM.

In terms of future needs for the current version of the FMV, discussions mainly highlighted the following issues:

- The need to enhance integration and inter-activeness between function and aspect description, and model view. In particular, the building of a "hyperlink" type of functionality (in the description field) was suggested as a way to improve the ability to place function understanding in the context of the model.

- The ability to visualise a comprehensive listing of functions was considered an important support to the iterative process that is required to balance both the "breath-before-depth" principle and the "stop rule" of FRAMing. It is essentially about providing the opportunity to come back to the fundamentals and grounds of the modelling exercise being undertaken. Such a listing could benefit from improved data import/export capabilities?
- The use of drop-down boxes (for aspect descriptions already made) as a support to a systematic description of functions and aspects, where the "copy-paste" principle of functioning would significantly facilitate initial steps.
- Adding a (mandatory) field for the description of the purpose for FRAMing as a way to encourage a sufficient in-depth consideration of modelling objectives as one of the fundamental and initial steps for the use of FRAM.
- Simulation capabilities were recognised as an important step for the development of FRAM and this was an issue addressed during various discussion periods, aside from this one. While the ability to bring dynamic features into models can be appealing and useful, there is a consensus that developments towards this must foremost adhere to FRAM principles and foundations, which means "escaping the trap" of over-simplified (linear) numerical simulations. Therefore, this domain will yet require substantial work.