
AIMMS Excel Add-In User's Guide - Introduction to the AIMMS Excel Add-In

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Part I

AIMMS Excel Add-In Tutorial

Chapter 1

Introduction to the AIMMS Excel Add-In

AIMMS is a very advanced optimization modeling tool, with which it's possible to implement optimization-based, but also non-optimization based, applications at a very high level. Because of the clear symbolic representation of a model in AIMMS, which can be structured in a tree, AIMMS is very well suited to

The AIMMS modeling system

- specify large-scale or complex optimization models, and
- implement possibly complex algorithms, including pre- and post-processing of data, around such optimization models.

In addition, because all implementation details are hidden from the modeler, AIMMS can be used to build an optimization-based application directly by application engineers, rather than having to hire programmers to build the actual application based on a specification on paper of the optimization model.

Despite these powerful capabilities of AIMMS, there are situations imaginable where it would be useful to be able to easily make use of the optimization power of AIMMS within other applications. For example, end-users might insist on using the common spreadsheet interface of Microsoft Excel for data entry, while the underlying optimization model could be more easily specified in AIMMS.

Combining AIMMS with other applications

The AIMMS Excel add-in provides an easy-to-use interface for using the power of AIMMS within Microsoft Excel spreadsheets. Although Microsoft Excel does offer some optimization functionality itself through its Solver add-in, there are several reasons why using the AIMMS Excel add-in would be a much better choice for integrating optimization in a spreadsheet:

The Excel add-in

- Optimization models can be specified much easier and more intuitively in AIMMS.
- Optimization models (and especially large-scale models) in Excel cannot be maintained very easily because the formulation is hidden in the cell formulas.
- Excel optimization models suffer from “dimensional arthritis”, i.e. the dimension of a multidimensional collection of variables can hardly be modified once the model is formulated.
- Optimization models in AIMMS solve much faster in general.

You should seriously consider using the AIMMS Excel add-in to implement optimization tasks in Excel, if

When to use

- the optimization model to be implemented is large-scale or very complex, and
- you are worried about the maintainability of the optimization model in Excel.

When an AIMMS model is combined with a Microsoft Excel spreadsheet, only the data needs to be represented in Excel, together with a specification of how Excel must interact with AIMMS. This means that the data and the algorithms for optimization can be separated, which allows the Excel user to focus on the part that is important to him, namely the data. The algorithms for optimization should be contained in the AIMMS model.

Separation of data and algorithms

The fact that AIMMS and Excel are being combined also has the advantage that the developer of the AIMMS model and the Excel spreadsheet can decide which data is accessible to the end user: this data can be put in the spreadsheet, while data that is not considered to be of use to the end user can remain in the AIMMS model. This offers the advantage that end users are only confronted with data that's important and meaningful to them.

Choice of data exposure

The fact that Microsoft Excel is very widespread makes it plausible that certain Excel applications already exist that make use of the solving capabilities of Excel. Those applications can now be improved by using the optimization power of AIMMS. The AIMMS Excel add-in makes it possible.

Improving existing applications

The interaction between AIMMS and Excel offers the possibility to exchange data between the two applications and to execute AIMMS-procedures from within Excel. You can control those processes through the provided interface of the Excel add-in by defining so-called *execution sequences* (see section ??).

The interaction