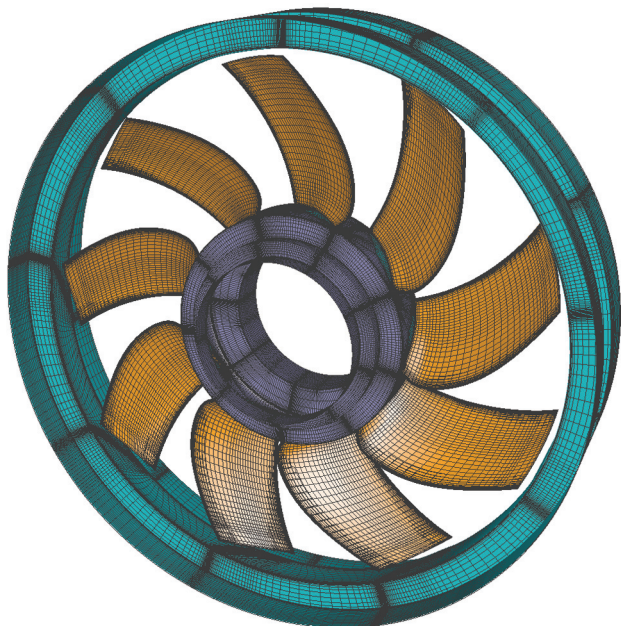


GridgenApp

A Unique Gridgen® Application



Automatic Mesh Generation for Automotive Cooling Fans



This fan grid was created automatically with Valeo's GridgenGlyph script.

In the ever changing automotive marketplace, manufacturers strive to produce differentiated and attractive products. To do this, they must shorten their development cycle. This challenge is met by the use of numerical tools such as computational fluid dynamics. Tier-1 suppliers like Valeo strongly invest in the use of multi-physics simulation software in order to improve both their expertise and their ability to design new parts in a very short timeframe. The constant improvements of fan systems over the years to become more compact, more efficient and less noisy are a clear evidence of the relevance of simulation-based design. In part, these results have been achieved with the help of commercial software like Gridgen.

Valeo chose Gridgen as a tool to help with the development of their fan system product line. Gridgen replaces the previous integrated meshing tools within CFX-TASCflow, which were based on parametric templates to create structured blocks and attach them together.

Geometry files describing the whole computational topology by curves and surfaces are read by Gridgen and converted into its database format. All connectors are directly created from curves, whereas the number of nodes and their distribution is completely parameterized in the script. Domains and blocks can be easily built on the base of previous connectors and database surfaces.

All these operations have been scripted in GridgenGlyph files, which have been linked in a final command file. The objective is to have an automated meshing tool for fans. This last point is absolutely needed because meshes must be created iteratively and automatically in a short amount of time (few minutes), if several simulations must be launched everyday to create performance curves for the designer.

In parallel to the creation of such standard grids used daily for fan development, the database and mesh previously described can also be used partially when there is a specific need for special geometries and more complicated fan system configuration. For instance, removing the rotating ring on the fan and replacing it by a more classical tip clearance between the blades and the stationary shroud requires only a few hours for an inexperienced user, while modifying the shape and the size of inlet or outlet domains can be done even more quickly.

In summary, Gridgen provided significant improvement, especially regarding the following aspects:

- rapid training of the whole fan system group
- ability to manage complex geometries with structured or unstructured meshes
- smoothing capabilities with outstanding performances
- output format available for all commercial codes and main standards of the market.
- possibility to script by Gyph command, which allows us to automatically create standard meshes.

For more information about the script Valeo is using, please contact Antoine Pages at Sirehna, antoine.pages@sirehna.com.

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213 South Jennings Avenue Fort Worth, Texas 76104-1107 Toll-free 800-4PTWISE
Tel (817) 377-2807 Fax (817) 377-2799 gridgen@pointwise.com www.pointwise.com

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