

## Automatic Mesh Generation Through Scripting

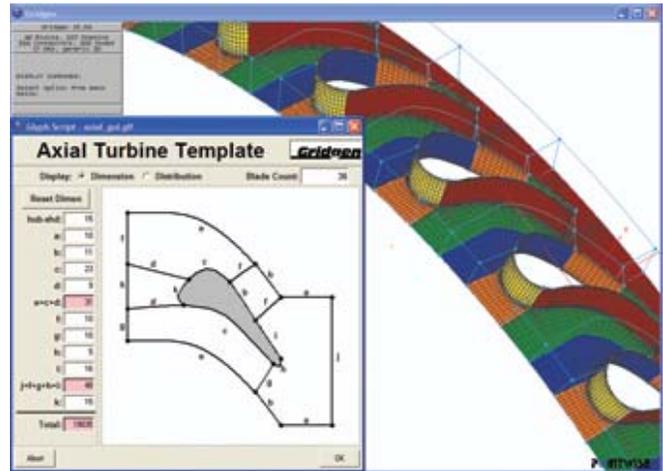
Build automated meshing applications, develop custom tools, and share your meshing expertise using the GridgenGlyph scripting language.

### The Problem

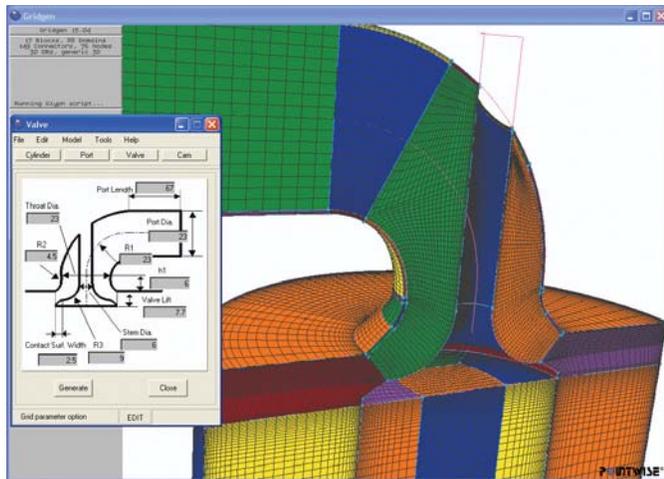
You use CFD to give you insight into fluid flow problems, analyze prototypes quickly, and improve your designs. CFD is just one of the tools you use, but it is the big, complicated power tool that takes a long time to set up and use properly. GridgenGlyph scripting can reduce that setup time and even hide the grid generation process completely, so you get the CFD results you need quicker and with less effort.

### The Gridgen Answer

GridgenGlyph is a Tcl (www.tcl.tk) based scripting language that provides access to all of Gridgen's functionality through a text interface instead of graphical user interaction. Glyph can be used for development of complete meshing applications, automation of repetitive tasks, and initialization scripts. And it works with Tk, a graphical user interface toolkit, so you can add custom interfaces to scripts.



The axial turbine script is one of the free example scripts included with every Gridgen



This Glyph application builds complete hex grids for intake ports in just seconds

### At last - one button meshing!

Since Glyph includes all Gridgen functionality, you can write scripts that build complete grids starting from a blank sheet or from a CAD geometry. Glyph's variables make it easy to systematically vary the geometry and grid for parametric studies. Pointwise, our partners and our customers have developed complete meshing applications for reentry vehicles, intake ports, torque converters, high lift wing systems, Formula One rear wings, axial turbines, pumps, inducers, and many other geometries. You can get started quickly with Gridgen's journaling capability.

### Couple with your solver for optimization!

Another powerful use of GridgenGlyph is coupling Gridgen with other software for automatic design optimization. Glyph allows Gridgen to be driven externally in a batch process. In one case, a user optimized the shape of a ship stabilizing fin by coupling Gridgen, a flow solver, the FIELDVIEW postprocessor, and an optimizer. Gridgen built the geometry based on parameters provided by the optimizer and generated a mesh that was provided to the flow solver. The flow solver computed the flowfield, which FIELDVIEW used to determine the force characteristics of the fin. This information was passed to the optimizer, which then generated new geometry parameters for Gridgen. They were able to analyze 70 design points in just over 5 hours.

### Automate repetitive tasks.

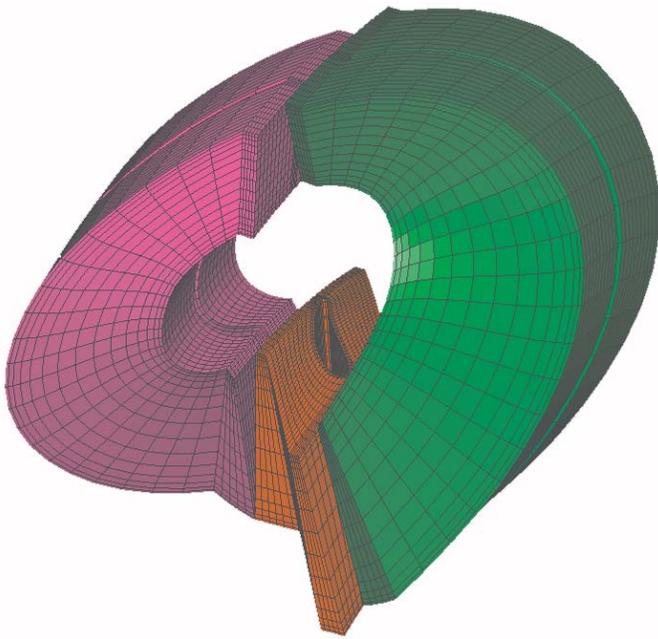
Glyph can also be used to automate just part of the meshing process. This is useful for operations that you perform often or for complex procedures that can be time consuming to perform interactively. Examples of such utilities we have already developed include scripts for turning domains into 2D blocks, diagnosing grid quality in a number of blocks, creating a circle from a center point and radius, and setting grid spacing based on turbulence model wall function requirements.

There are even some things you can do in Glyph that cannot be done interactively. This includes changing the colors in Gridgen's color palette and rotating the display to an exact specified angle or by a specified amount.

Many of the scripts and utilities mentioned above are included with every Gridgen. In addition to being useful functions, these supplied scripts serve as good examples for people just getting started with Glyph.

### Customize Gridgen at startup.

Another use of Glyph is initialization of Gridgen. When Gridgen starts it looks for a Glyph initialization file. If it is present, Gridgen reads it and executes the script commands it contains. Typically this is used for things like customizing mouse button actions, changing the default display settings, and setting tolerances. It can be used to automatically read in your geometry and grid when you start Gridgen. This is also useful as an archiving feature so you always know which geometry and grid you used for a project.



Automatically meshed pump, stator and turbine from a torque converter developed by AISIN AW and Vinas Co., Ltd.

### Capture a journal file to playback later.

GridgenGlyph also includes a journaling feature that captures script commands to a file as you interactively build a grid. Glyph's variables and modality make journal files easy to follow and modify so you can playback the journal to create an altered grid.

You can use variables even when you are not journaling or scripting. Gridgen's type-in field includes a full Tcl interpreter so you can use a Tcl expression anywhere a typed in value is needed.



### Learn more right now!

GridgenGlyph can automate grid generation and make your life easier. You can write your own scripts, capture journal files, or, if you don't want to do it yourself, we would be happy to develop a standalone meshing script or utility for you. For more information visit our web site

<http://www.pointwise.com/focus>,

or call us at 888-GRIDGEN.

and we will send you a fully functional Gridgen to try for yourself for 60 days at no charge.

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