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Fidelity Pointwise Accelerates CFD With High-Quality Meshes

Preprocessing software for delivering robust, high-quality meshes for CFD computations

Mesh quality is the key to converged and accurate CFD solutions. With Cadence[®] Fidelity[™] Pointwise, you get all the tools you need to achieve the desired results – high levels of automation plus detailed levels of control. Pointwise guides you through the process of dealing with less-thanperfect geometry models to formatting the most robust grid for your flow solvers. Once your mesh is complete, you can export it along with flow solver boundary conditions to many popular open-source, commercial, and standard CFD formats.

Solid Modeling, Fault-Tolerant Meshing, and Mesh-Geometry Independence

Fidelity Pointwise's suite of solid modeling operations is designed to form imported geometries into watertight solids where gaps are closed implicitly so that meshing can proceed without a hitch. Alternatively, a technique called merging automatically identifies adjacent surface meshes, joins them across geometry model gaps, and uses the mesh solver to remove geometry artifacts such as topology and sliver surfaces from the mesh. Furthermore, Fidelity Pointwise's built-in geometry modeler may be used to supplement what is imported from a CAD system or even create new models from scratch.

Meshing Features

DATASHEET

Hybrid viscous meshing

Fidelity Pointwise's proprietary T-Rex technology, an advancing layer technique, automatically generates highquality prism and hex-dominant viscous meshes while adjusting to convex and concave regions and colliding fronts.



Figure 1: Hybrid viscous meshing



Figure 2: Solver-agnostic mesh adaptati

Overset meshing

With direct interfaces to the industry's most robust overset grid assemblers, Fidelity Pointwise can run the entire assembly process, visualize overset meshing results, and perform remediation through mesh adaptation.



Figure 3: Overset meshing

Structured meshing

Fidelity Pointwise's best-in-class quad and hex meshing techniques have been honed since 1984. Elliptic and hyper- bolic PDE-based smoothing, algebraic extrusions, and other technologies enable the creation of high-quality structured meshes that industrial users have relied on for decades.



Figure 4: Structured meshing

High-order meshing

To generate the high-order meshes that high-order solvers require, Fidelity Pointwise features an optimization-based high-order meshing technology. This allows using fewer elements to resolve curved geometry while improving spatial and temporal accuracy.



Figure 5: High-order meshing

Solver-agnostic mesh adaptation

Take the guesswork out of a priori mesh refinement by performing user-independent adaptation. Fidelity Pointwise supports solver-driven volume and surface-constrained mesh refinement to improve simulation accuracy.

Glyph scripting

Fidelity Pointwise's scripting language, Glyph, provides customization capabilities for both the experienced analyst and design engineer. Analysts will find that Glyph's commands cover the entire range of functionality available in Fidelity Pointwise's GUI, allowing special techniques to be captured and made part of your organization's intellectual property. Design engineers will appreciate the fact that Glyph can be used to create customized meshing applications for specific configurations, allowing them to automatically generate a mesh and apply CFD.





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