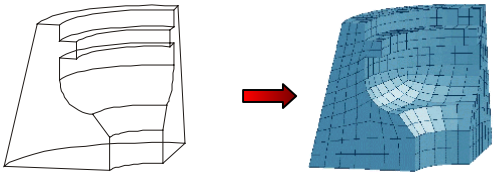
NEW GRID-BASED FINITE ELEMENT MESH GENERATION ALGORITHMS FOR NON-MANIFOLD GEOMETRIC MODELS

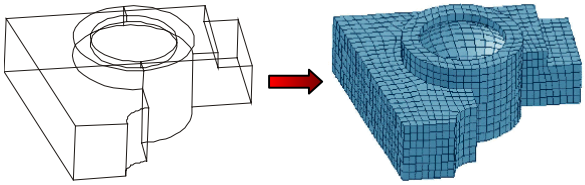
Generating a mesh for geometric model that has gone through idealization has been a complex problem due to the presence of mixed three-dimensional and two-dimensional sub-parts. These sub parts are usually the source of non-manifold topologies in the idealized model. A method that utilizes model transformation and mesh mapping techniques is used to generate hexahedral meshes for the three-dimensional sub-parts while the two-dimensional sub-parts are meshed using a grid-based algorithm. Mesh modification strategies are then applied to the mixed meshes to ensure conformity.

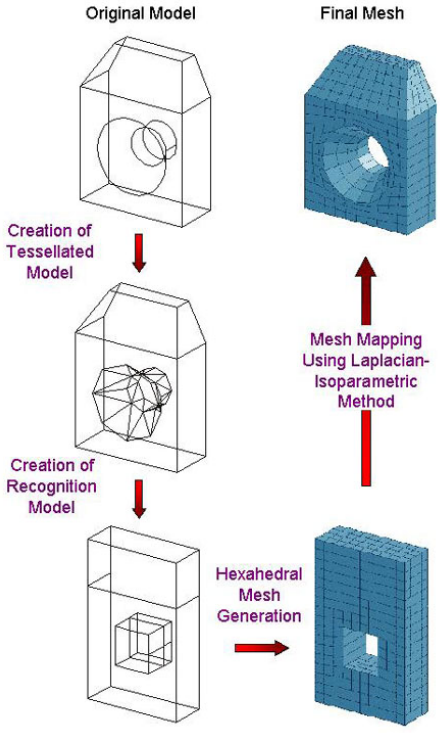
Automatic Hexahedral Mesh Generation Using Model Transformation and Mesh Mapping

- Creation of a Tessellated Model from the Original Model
- Construction of a Recognition Model via Fuzzy Logic Reassignment of Geometrical Definition
- Automatic Grid-based Mesh Generation for the Recognition Model
- Mesh Mapping from the Recognition Model to the Original Model Using the Laplacian-Isoparametric Method



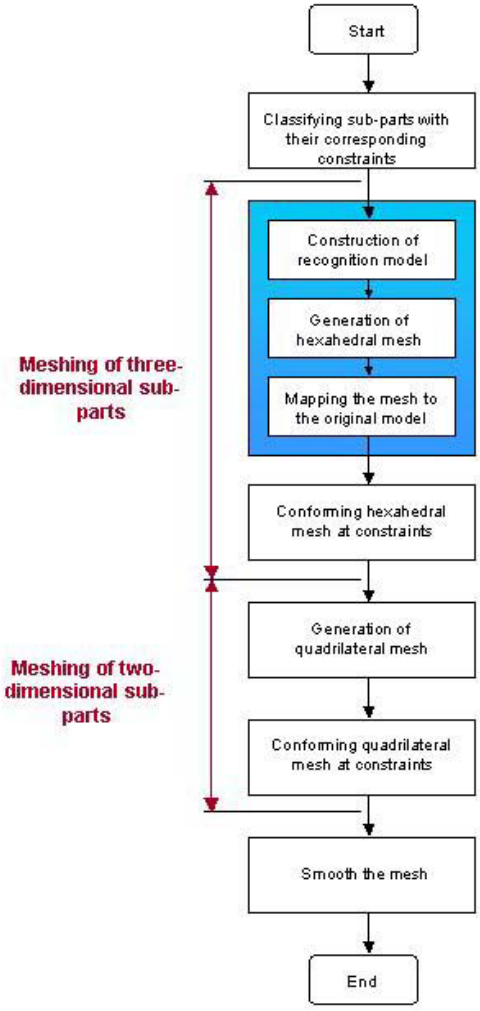
Original Models Hexahedral Meshes

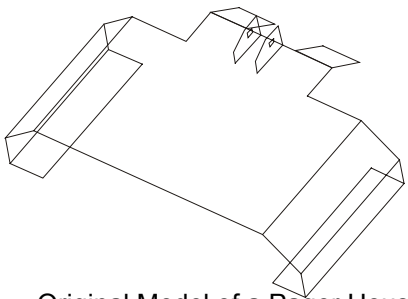




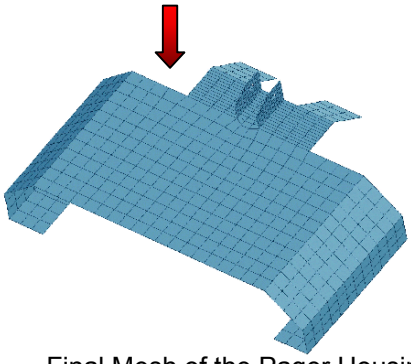
Automatic Mesh Generation for Non-Manifold Models

Overall Scheme of Non-manifold Mesh Generation.





Original Model of a Pager Housing



Final Mesh of the Pager Housing