

# Remeshing to enhance numerical simulation: from general remarks to a concrete exemple with the Mmg platform

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## ABSTRACT

Mesh generation and modification has long been identified as a bottleneck in a wide variety of applications (mostly due to the fact that this step can not be completely automatized). The use of a remesher can help user save a considerable amount of time in various stages of the simulation:

- First, it decouples the stage of mesh generation, properly speaking, and the task of creating high-quality elements, which can be postponed as a post-processing issue;
- second, mesh adaptation allows to tackle very large problems which otherwise would be impossible;
- lastly, it allows for mesh modifications (lagrangian movement, isovalue discretization...) inside a simulation software without the creation of a new mesh.

In this presentation, we will highlight some of the difficulties and challenges of mesh modifications (especially in the case of mesh adaptation and isovalue discretization). We will then show an example to demonstrate specifically how surface reconstruction and surface and volume remeshing are performed within the Mmg platform. We finish with a very fast tutorial of this remesher and illustrate our work with beautiful examples of mesh modifications provided by Mmg users.

## REFERENCES

- [1] Dapogny, C. and Dobrzynski, C. and Frey, P. Three-dimensional adaptive domain remeshing, implicit domain meshing, and applications to free and moving boundary problems. *J. Comput. Phys*, Vol. **262**, pp. 358–378, (2014).