

## Automatic Local Remeshing of Unstructured Quadrilateral Meshes in Problems with Large Deformations

Alexander V. Skovpen, Vladimir A. Bychenkov and Irina I. Kuznetsova

a.v.skovpen@vniitf.ru, v.a.bychenkov@vniitf.ru, i.i.kuznetsova@vniitf.ru

Russian Federal Nuclear Center – Zababakhin Institute of Technical Physics (RFNC-VNIITF)  
Snezhinsk, Russia

When problems with large deformations are modeled with Lagrangian meshes, cells become deformed and often unacceptable for further calculation. To resolve this problem the technique of automatic local remeshing of 2D quadrilateral meshes was developed.

Mesh quality is continuously controlled during calculation. If the mesh becomes “bad” in local sub-domain, it is smoothed. If smoothing does not help, overall remeshing is done in bad sub-domains, using the advancing front method of unstructured quadrilateral meshing. It is necessary to take into account contradictory factors during choosing of remeshing sub-domain. It must not be too large to avoid redundant rezoning. On the other hand, if the sub-domain is too small and narrow, the quality of a new mesh generated within its boundaries won't be good.

The proposed technique of automatic local remeshing is implemented as a dynamic link library. It is used in a number of modeling programs as a means of maintaining the geometric quality of meshes. Examples of problem solved with the use of automatic local remeshing are provided.