

#1119: Defining master and slave roles for contact surfaces in a contact pair

Product: OptiStruct

Product Version: 12 and greater

Computer Hardware: All supported

Computer Operating System: All supported

Industry: Any

Categories: Structural Analysis

Subcategories: Setup and Contact Definition

Topic Objective

Defining master and slave roles for contact surfaces in a contact pair.

Background

The choice of master and slave roles for contact pairs has a significant impact on the quality of results and can be a key factor on nonlinear convergence. This choice must be done during the preprocessing step, while defining contact pairs.

Node-to-surface is the most traditional discretization method for contact interactions. In this approach, each slave node effectively interacts with a projection point on the master surface. Slave nodes are constrained to do not penetrate the master surface. However, nodes lying on the master surface, in principle, can freely penetrate on slave surface. Considering these facts, some rules should be followed when defining master and slave roles for contact surfaces in a contact pair:

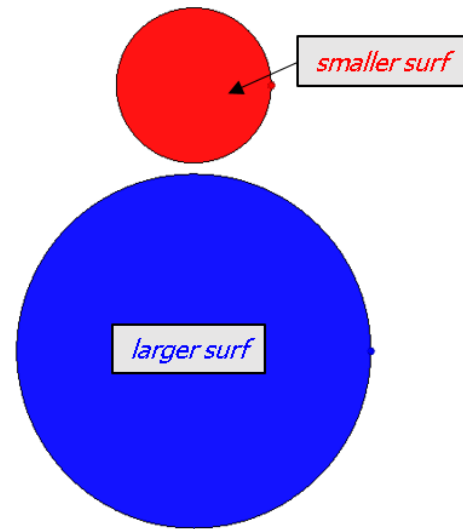
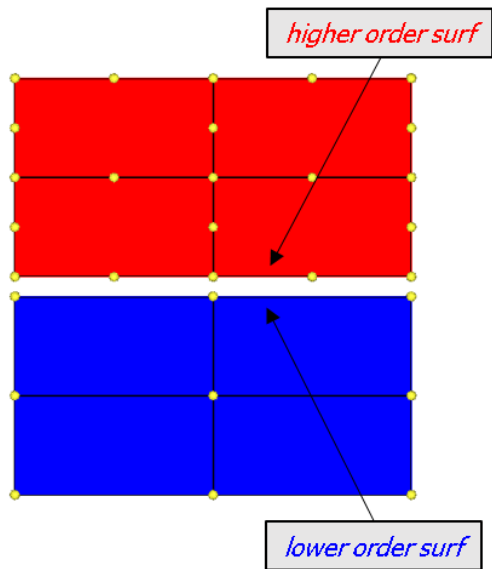
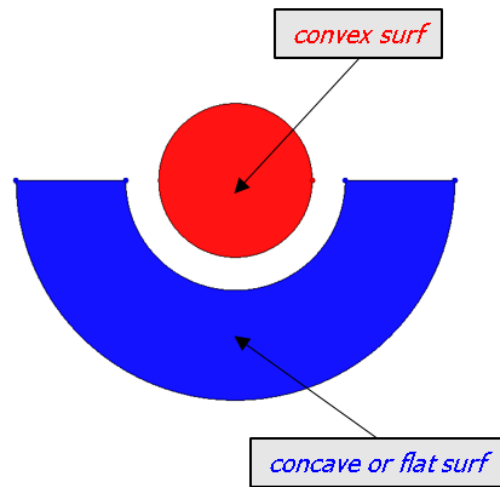
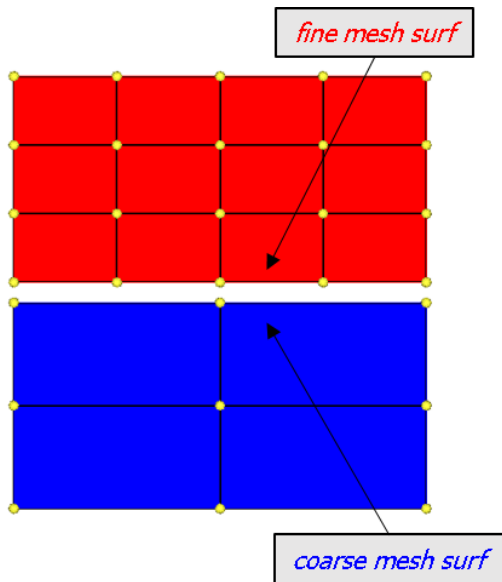
- The coarser mesh should always act as MASTER surface;
- If surfaces are comparable in refinement, the stiffer one should be defined as MASTER surface (taking into account the material and shape stiffness);
- If surfaces are comparable in refinement and stiffness, the larger surface should be chosen as MASTER surface.

These simple rules also imply that:

- Rigid surfaces must always act as MASTER surfaces, and
- Node based surfaces can act only as SLAVE surfaces.

Although the same rules also apply to surface-to-surface discretization, this approach is less sensitive to the choice.

Examples



 **SLAVE surf**
 **MASTER surf**