Plate With a Hole Optimization - Pre-Analysis & Start-Up

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Pre-Analysis & Start-Up

Pre-Analysis

While the case of an infinite plate with a hole and a radially outward pressure within the hole has an analytical solution, the case of a finite plate with a hole does not. The lack of an analytical solution favors finite element analysis as a solution method. This tutorial, will start out by using ANSYS to find the deformation and equivalent Von Mises stress for a specific plate with a hole geometry. After the initial solution is obtained, ANSYS will be told which variables are the design variables and what results are the output parameters. These variables can be viewed as follow.

Design Variables: Radius
Objective function: Minimize volume
Constraints: Equivalent Von-Mises stress < 32.5 ksi

From there, the optimization procedures will be run.

Start-Up: Download Files

In this tutorial the initial ANSYS Geometry and Mechanical Files are provided. If you will use SpaceClaim, download the Workbench files here, then double-click on the .wbpz to open the file.

If you want to use DesignModeler, download the files here. You will find a .wbpj file and its corresponding folder. Open this project in Workbench by double-clicking on "plate_opt.wbpj".

Go to Step 2: Initial Solution

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