# ANSYS - Plate with a Hole - Step 2

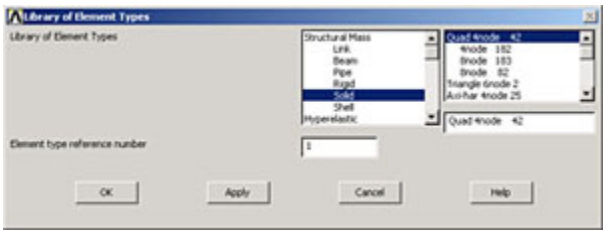


## Step 2: Specify element type and constants

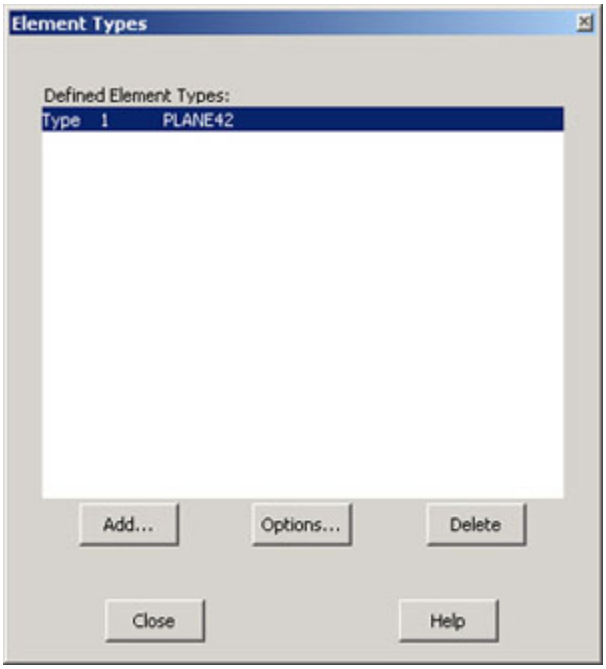
### Specify Element Type

**Main Menu > Preprocessor> Element Type > Add/Edit/Delete > Add...**

Pick ***Structural Mass*** with subtype ***Solid*** in the left field. Pick ***Quad 4 node 42*** in the right field. Click ***OK*** to select this element.




You'll now see the ***Element Types*** menu with ***PLANE42*** as the only defined element type.




Let's take a look at the online help pages to learn about the properties of this element.

**Utility Menu > Help > Help Topics**

Select the ***Search*** tab, type in ***pictorial summary*** as the keyword and click ***List Topics***. You should see ***Pictorial Summary*** as one of the topics listed; double-click on this. This brings up the *Pictorial Summary of Element Types* help page. Scroll down to ***Plane42*** under *Structural 2-D Solid.* Note that the *PLANE42* element is defined by four nodes with two degrees of freedom at each node: translations *UX* and *UY* in the (nodal) x and y-directions.

Click on the ***PLANE42*** box to bring up the help page for this element. Read the *Element Description* and take a look at the figure of the element. Think about why this element is appropriate for the problem at hand. Minimize the help window.

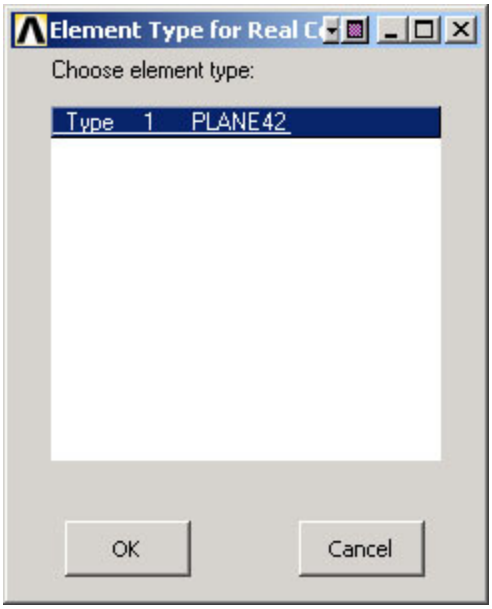
If you actually read the *Element Description* for PLANE42, you'd have noticed that this element can also be used for axisymmetric problems. In the axisymmetric case, you would choose ***Options***... for the element in the *Element Types* menu. Note that in the *PLANE42 element type options* menu that comes up, under ***Element behavior***, you have the option of ***Axisymmetric***. For the current problem, we'll of course use the default of ***Plane stress***. Click ***Cancel*** to exit the *PLANE42 element type options* menu retaining the defaults.

***Close*** the *Element Types* menu.

## Specify Element Constants

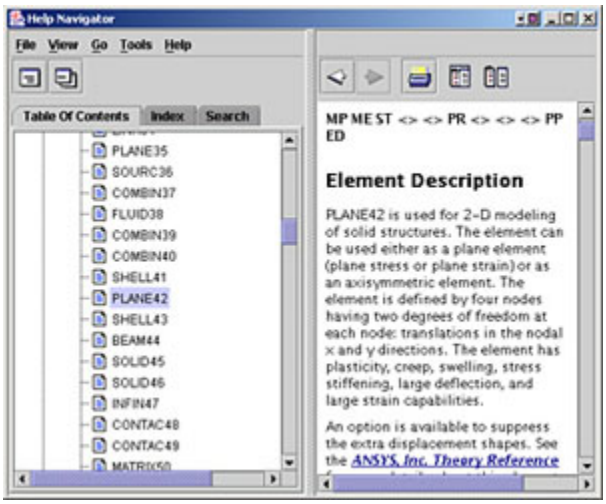
**Main Menu > Preprocessor> Real Constants > Add/Edit/Delete > Add**

This brings up the *Element Type for Real Constants* menu with a list of the element types defined in the previous step. We have only one element type and it is automatically selected.




Click ***OK***.

You should get a note saying "Please check and change keyopt setting for element PLANE42 before proceeding." Close the warning window and the *Real Constants* menu. To see what this message implies, let's again take a look at the help pages for PLANE42.




Under *PLANE42 Input Summary*, the documentation says that there are no real constants for this element when KEYOPT(3)=0, 1, 2.

To see what the value of KEYOPT(3) is, bring up the Element Type menu again:

**Main Menu > Preprocessor> Element Type > Add/Edit/Delete > Options**

***K3*** i.e. KEYOPT(3) is set to ***Plane stress***. In the help page, under *PLANE42 Input Summary*, you can check that plane stress corresponds to KEYOPT(3) =0. Thus, there are no real constants to be specified. That's why we got the "Please check and change keyopt settings..." warning message. Of course, the ANSYS warning could have been less cryptic but what fun would that be.

***Cancel*** the *PLANE42 element type options* menu, ***Close*** the *Element Types* menu and close the *Element Type* sticky menu.

### Save your work

**Toolbar > SAVE_DB**

**Go to Step 3: Specify material properties**

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