

# Ansys Workbench Panukl – extension

## 1. Extension installation and loading

The Panukl extension was prepared for Ansys Workbench version 19, or newer.  
Open in Ansys Workbench: *Extensions > ACT start page > Manage Extensions* Figure 1.

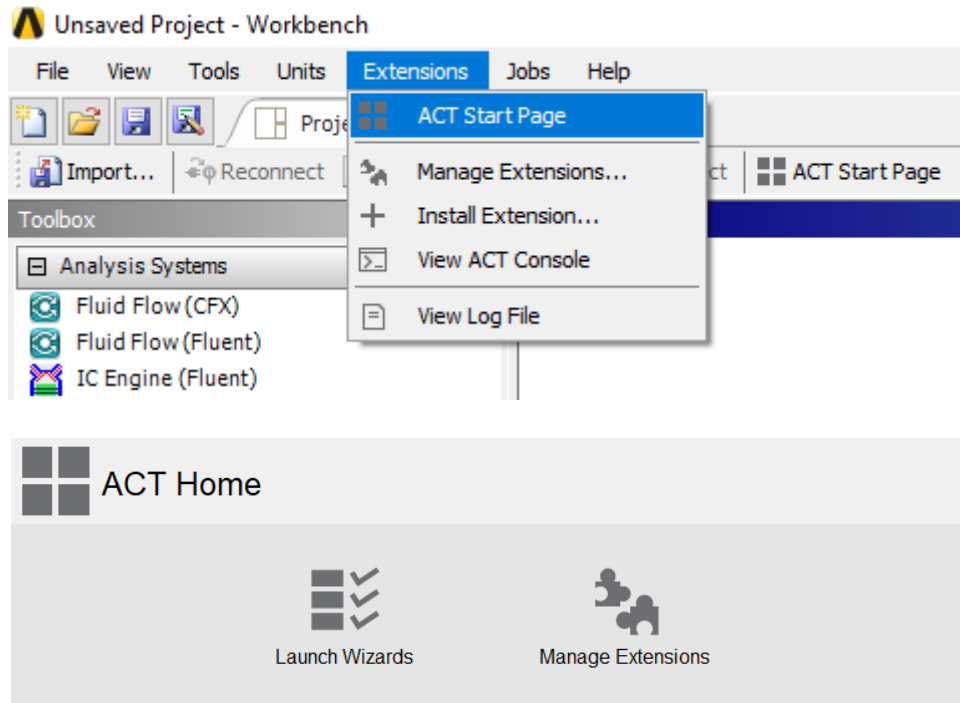
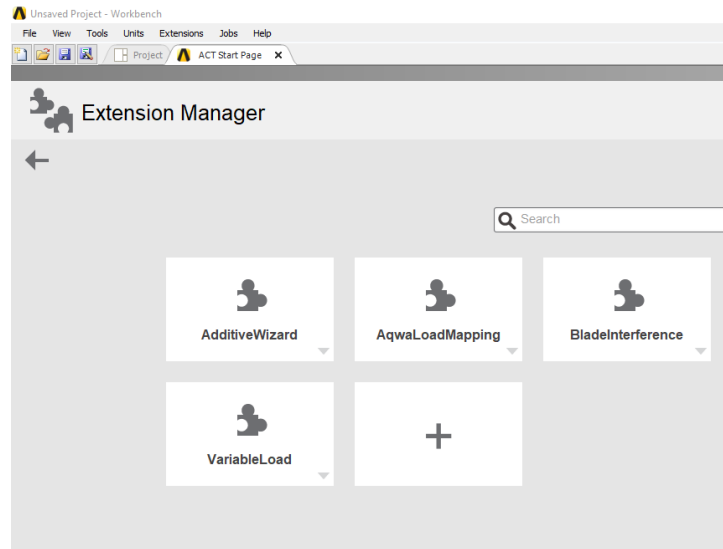


Figure 1 Starting Extensions manager.

- a. Script extension - can be modified (appropriate license needed)  
Unpack and copy the extension to:  
C:\Users\UserName\AppData\Roaming\Ansys\v195\ACT\extensions  
Now when Ansys Workbench is opened It should be automatically loaded to *Extensions Manager* for selection (if appropriate license is available).

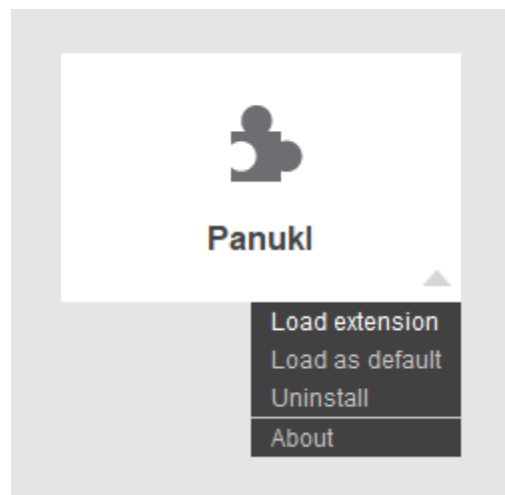
Optionally convert to binary extension - open:  
*App Builder > Import extension > Export as a binary extension*

- b. Binary extension  
Select *Install/+* extension and select from computer the *Panukl.wbex* binary extension  
Figure 2.

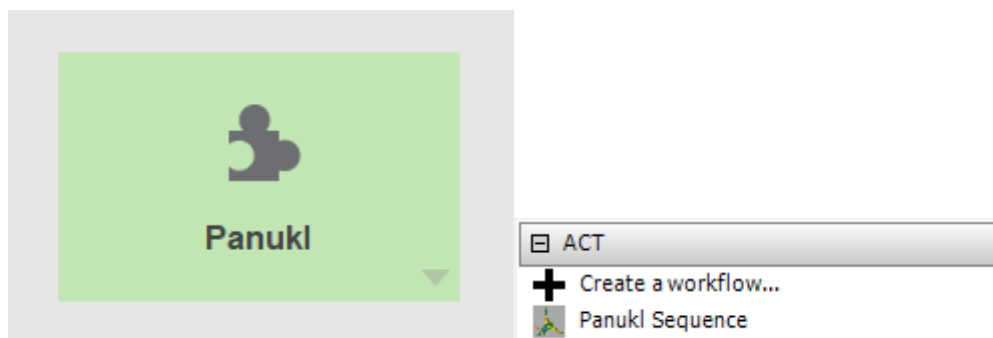


**Figure 2 Select +/Install to add binary extension.**

In *Ansys Manage Extensions* select Panukl extension (script, or binary) and *Load extension*, or *Load as default* Figure 3. When the extension is loaded it's color turns green and it appears in the Toolbox tree Figure 4.



**Figure 3 Loading extension.**



**Figure 4 Extension after loading.**

## 2. Using the extension

1. Open Ansys Workbench
2. Save empty *Project* with chosen unique name (from now on in the manual it will be called *the Project*)
3. Open Panukl application and in *Tools > File location...* Figure 5 change:
  - a. *Project data files directory*
  - b. *Output files directory*
  - c. *User profiles library*

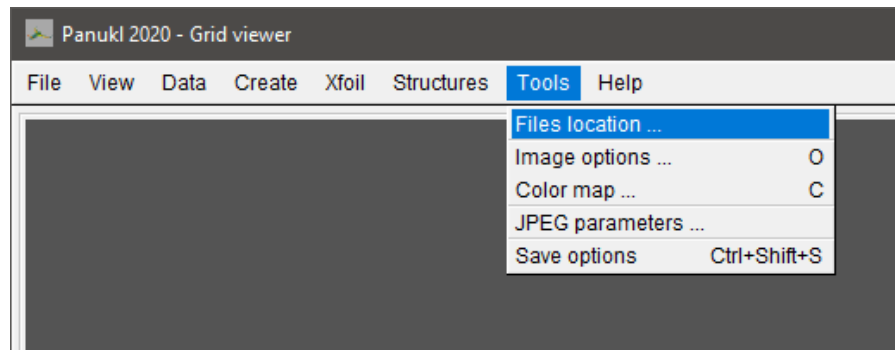


Figure 5 Setting Panukl's working directories.

For directories inside *the Project's* catalogue structure, for example *.../theProject\_files/user\_files/Panukl*

This will assure that all Panukl's files remain in *the Project* directory, even when transferred to other computer. If *the Project* remains on one computer this step can be omitted.

4. If the Panukl extension wasn't loaded to Ansys Workbench see previous chapter.
5. In Ansys Workbench drag *Panukl Sequence* from Toolbox tree Figure 4 to *Project Schematic* area Figure 6.

Project Schematic

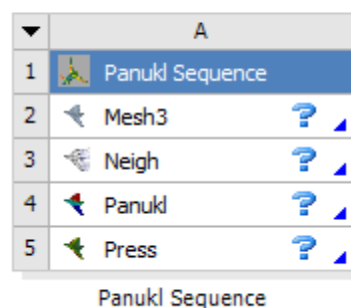


Figure 6 The extension in the *Project Schematic* area.

6. If *Properties* window Figure 7 is not visible enable *View > Prosperities*.

Properties of Project Schematic		
	A	B
1	Property	Value
2	[-] Notes	
3	Notes	
4	[-] Solution Process	
5	Update Option	Run in Foreground

Figure 7 Properties window.

## 7. Choosing properties

All selected files in properties have to exist. It is advised to proceed through Panukl sequence manually to set up all the configuration files and checking visually quality of the mesh.

- a. Select the task *Mesh3* Figure 6 and in the properties window select *Input Geometry File \*.ms2* (marked yellow) Figure 8. In the window which will appear choose the input file and approve with *Finish* button (see next section how to assign parameters). Update the task Figure 9.

15	[-] Input Specifications	
16	Input Geometry File *.ms2	

Figure 8 Choose input file.

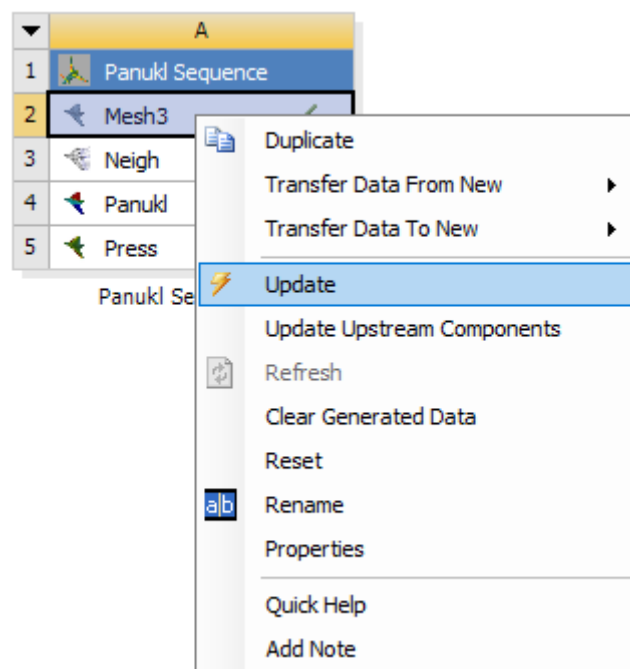


Figure 9 Update task.

- b. Repeat the procedure with the *Neigh* task analogously as with the *Mesh3* task. Select the task *Neigh* and in the properties window select *Input Configuration File \*.ngh* (marked yellow). In the window which will appear choose the input file and approve with *Finish* button. Update the task Figure 9.

- c. Repeat the procedure with the *Panukl* task analogously as with the *Mesh3* task. Select the task *Panukl* and in the properties window select *Input Configuration File \*.par* (marked yellow). In the window which will appear choose the input file and approve with *Finish* button. Update the taskFigure 9.
- d. Repeat the procedure with the *Press* task analogously as with the *Mesh3* task. Select the task *Press* and in the properties window select *Input Configuration File \*.prs* (marked yellow). In the window which will appear choose the input file and approve with *Finish* button. Additionally select *Panukl Working Directory* (all output files are copied to the task working directory) and one of the *Output File* to assign later output parameters (see next section how to assign parameters). Update the taskFigure 9.

#### 8. Save the Project.

If changes are made to the configuration files selected, for example setting new file path directories, the configuration file has to be selected again to load new settings.

### 3. Assigning input/output parameters

The chapter describes how to assign input and output design parameters for the configuration files used by Panukl. The procedure will be shown on an example where the input parameters are assign for *\*.ms2* file and output parameters for the *\*.out* file:

- *theProject.ms2*  
(in task *Mesh3*)
  - *c1* (input design parameter, wing's first chord length)
  - *c2* (input design parameter, wing's second chord length)
  - *c3* (input design parameter, wing's third chord length)
  - *b* (input design parameter, wing's tip span)
- *theProject.out*  
(in task *Press*)
  - *Cx* (output design parameter, drag coefficient)
  - *Cz* (output design parameter, lift coefficient)

In task *Mesh3* in *Properties* window select again *Input Geometry File \*.ms2*. Since *\*.ms2* is an input file input parameters will be defined. In the text display, where loaded configuration file should be visible, mark the value which will be one of the design parameters. The value is copied to the input field below *Parameter Value*. In the input field *Parameter Name* unique design parameter name should be given. To confirm definition of new design variable button *Add Parameter* should be press, the new design parameter will appear in the table on the ride side of the window and will be marked with navy blue color in the text display Figure 10. When all design parameters are defined close the window with the *Finish* button Figure 11. Definition of design parameters can be also done immediately when the configuration files are selected for the first time.

The procedure should be repeated for output design parameters selected from output file *\*.out*. Figure 12 shows Workbench view when the output design parameters are defined.

Input design parameters can be defined for any input configuration file, for example Angle of Attack in the *\*.ngh* and *\*.par* files.

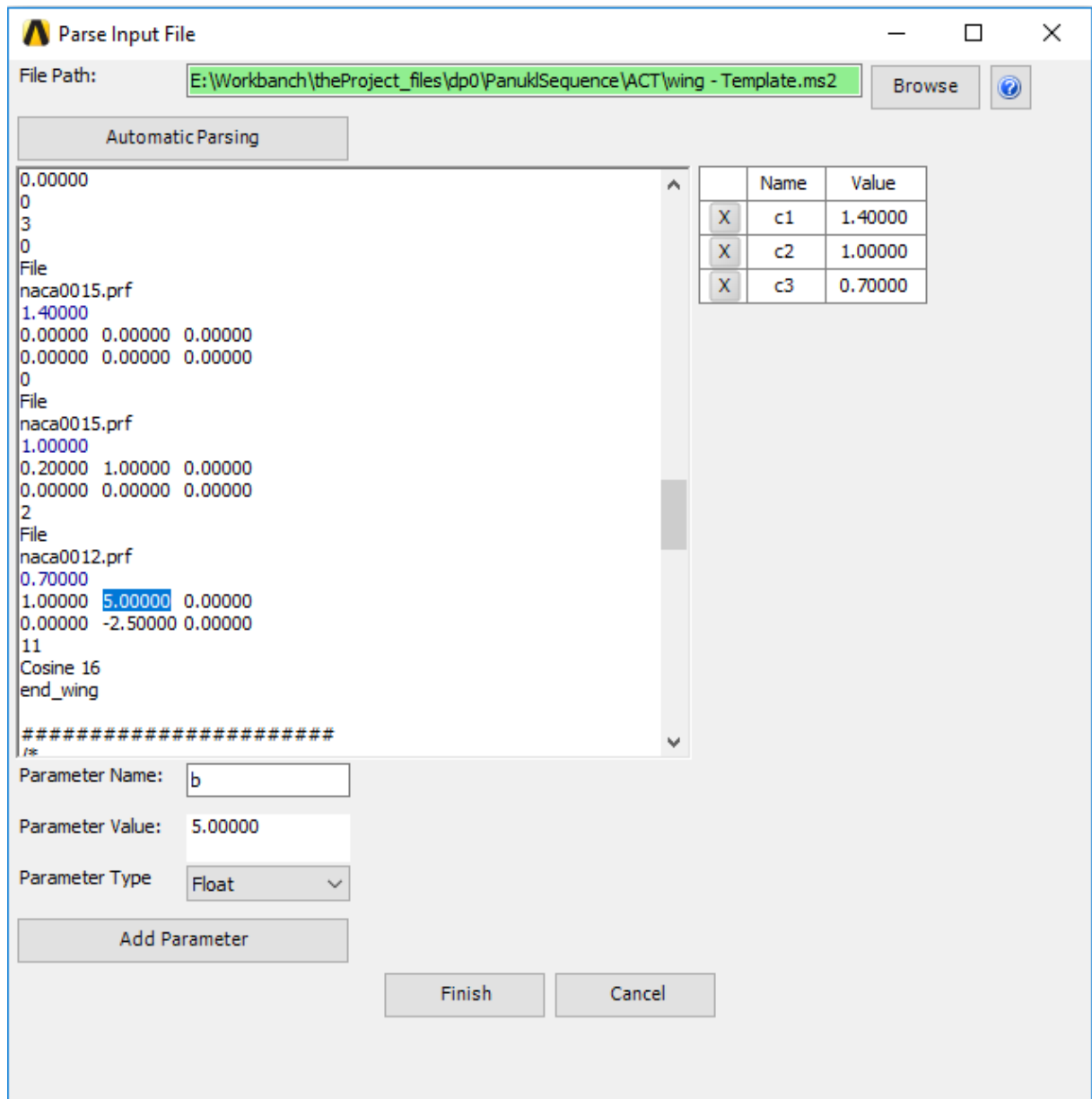


Figure 10 Input design parameters definition.

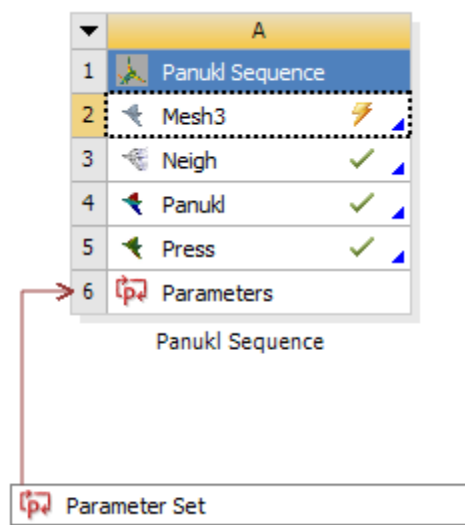


Figure 11 Parameters set block in the Workbench window with input parameters defined.

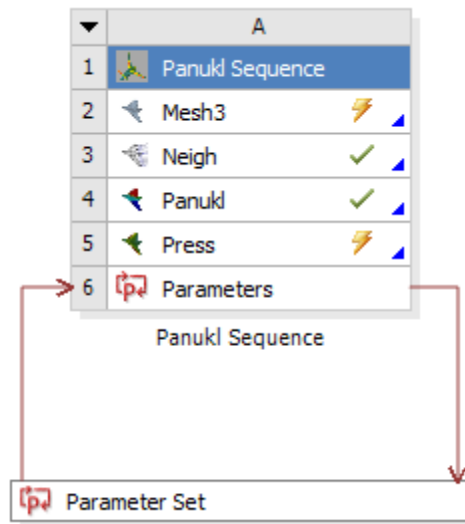


Figure 12 Parameters set block in the Workbench window with input and output parameters defined.

When the block *Parameter Set* is double clicked or edited from context menu configuration of design parameters will appear in Workbench in a new tab Figure 13. On the right side of the tab *Table of Design Points* is visible, if the design point is not updated (yellow lightning) select the row with right mouse button and from context menu choose *Update Selected Design Points* Figure 14.

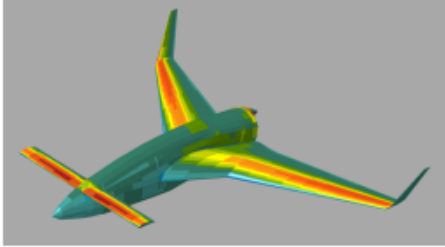
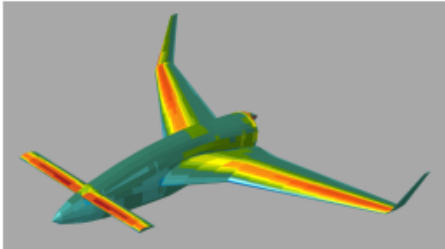
Outline of All Parameters				
	A	B	C	D
1	ID	Parameter Name	Value	Unit
2	Input Parameters			
3	 Panukl Sequence (A1)			
4	P1	Mesh3::c1	1.4	
5	P2	Mesh3::c2	1	
6	P3	Mesh3::c3	0.7	
7	P4	Mesh3::b	5	
*	New input parameter	New name	New expression	
9	Output Parameters			
10	 Panukl Sequence (A1)			
11	P5	Press::Cx		
12	P6	Press::Cz		
*	New output parameter		New expression	
14	Charts			

Figure 13 Outline of the design parameters.

New design points can be defined manually, by setting new design parameter values in subsequent rows. Next *Update Selected Design Points*, or *Update All Design Points* should be selected, then all output design parameters should be calculated and updated Figure 15. If appropriate license is available *Design Exploration* tools can be used on the design parameters for optimization Figure 16. Figure 17 shows *Design Exploration* tools connected to the *Parameter Set* in the Workbench window.

Table of Design Points								
	A	B	C	D	E	F	G	H
1	Name	P1 - Mesh3::c1	P2 - Mesh3::c2	P3 - Mesh3::c3	P4 - Mesh3::b	P5 - Press::Cx	P6 - Press::Cz	Retain
2	DP 0 (Current)	1.4	1	0.7	5	0.72027	0.4029	<input checked="" type="checkbox"/>
*								<input type="checkbox"/>

Copy  
Paste  
Set Update Order by Row  
Show Update Order  
Optimize Update Order  
Duplicate Design Point  
Set as Current  
Export Selected Design Points  
Update Selected Design Points  
Export Table Data as CSV

Figure 14 Updating design points.

Table of Design Points							
	A	B	C	D	E	F	G
1	Name	P1 - Mesh3::c1	P2 - Mesh3::c2	P3 - Mesh3::c3	P4 - Mesh3::b	P5 - Press::Cx	P6 - Press::Cz
2	DP 0 (Current)	1.4	1	0.7	5	0.72027	0.4029
3	DP 1	1.2	1	0.7	5	0.75534	0.40384
4	DP 2	1.4	0.8	0.7	5	0.66919	0.39707
5	DP 3	1.2	0.8	0.7	5	0.43985	0.39897
6	DP 4	1.4	1	0.7	6	0.77171	0.41151
7	DP 5	1.2	1	0.7	6	0.80971	0.41323
8	DP 6	1.4	0.8	0.7	6	0.64668	0.8364
9	DP 7	1.2	0.8	0.7	6	0.67743	0.40801
*							

Figure 15 List of design points set manually.

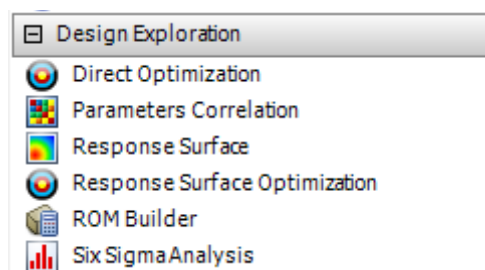


Figure 16 Design Exploration tools.



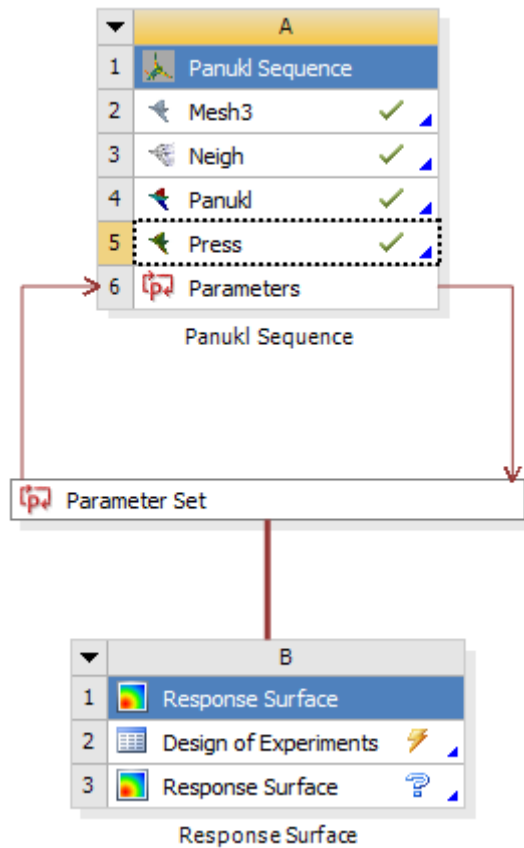


Figure 17 Design Exploration tools connected to design Parameter Set.

#### 4. Panukl extension debugging

To check for possible problems and the extension proceeding details open:  
*Extensions > View Log File*