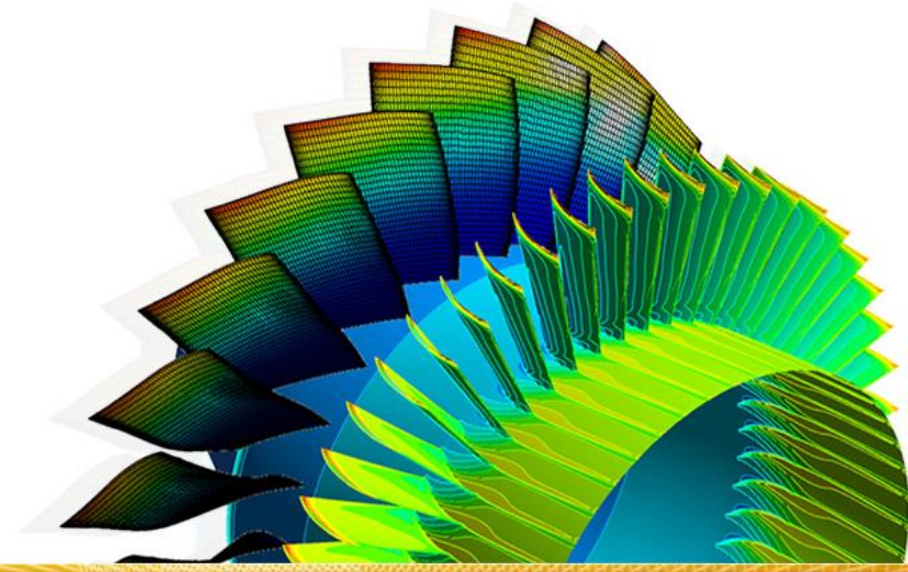
ANSYS Composite PrepPost 19.0

Module 8: Parameters in ANSYS Composite PrepPost



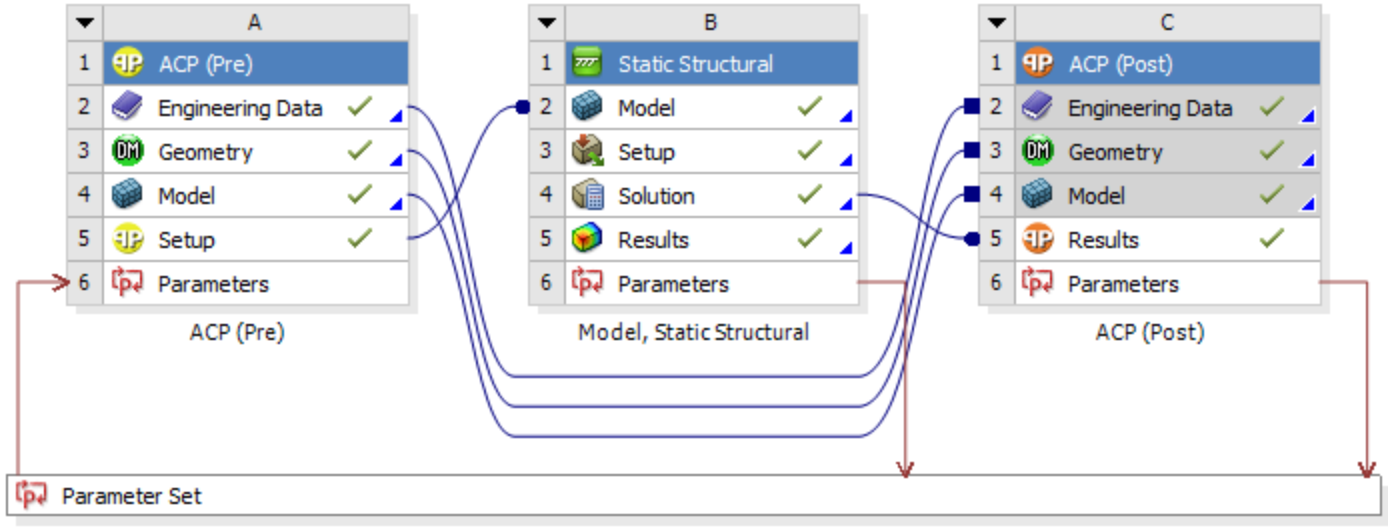
8 Parameters in ANSYS Composite PrepPost

Agenda

- Parameters in ANSYS Workbench
- Input Parameters in ANSYS Composite PrepPost
- Output Parameters in ANSYS Composite PrepPost
- Design Studies within ANSYS Workbench

8 Parameters in ANSYS Composite PrepPost

- Design studies are an important part of the product development cycle. The parametric environment of ANSYS Workbench is well suited for design studies and design optimization.
- ANSYS Composite PrepPost allows using input and output parameter for design studies.



8 Parameters in ANSYS Composite PrepPost

- All parameters (input and output) are shown in the parameter overview of ANSYS Workbench.

Input Parameter

Output Parameter

Outline: No data

	A	B	C	D
1	ID	Parameter Name	Value	Unit
2	Input Parameters			
3	ACP (Pre) (A1)			
4	P1	ModelingPly.1.ply_angle	0	
5	P2	ModelingPly.2.ply_angle	0	
6	P3	ModelingPly.3.ply_angle	0	
7	P4	ModelingPly.4.ply_angle	0	
8	P5	ModelingPly.5.ply_angle	0	
9	P6	ModelingPly.6.ply_angle	0	
*	New input parameter	New name	New expression	
11	Output Parameters			
12	ACP (Post) (C1)			
13	P13	Sensor.1.Price	2.5816	
14	Static Structural (B1)			
15	P9	Moment Reaction Torsion Minimum Z Axis	-3897.4	N m
16	P10	Moment Reaction Bending Minimum X Axis	-12260	N m
17	P11	Torsion Stiffness	-2998	N m
18	P12	Bending Stiffness	-6130	N m
*	New output parameter		New expression	
20	Charts			

Table of Design Points

	A	B	C	D	E	F	G	H	I
1	Name							P13 - Sensor .1.Price	P11 - Torsion Stiffnes
2	Units								N m
3	Current	0	0	0	0	0	0	2.5816	-2998
4	DP 1	45	-45	45	-45	45	-45	2.5816	-4235.5
5	DP 2	45	-45	0	0	45	-45	2.5816	-3852.2
6	DP 3	30	30	0	0	-30	-30	2.5816	-3618.4
*									

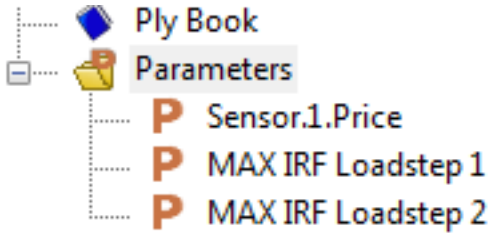
Table of Design Points

8 Parameters in ANSYS Composite PrepPost

- In ANSYS Composite PrepPost input parameters are defined based on the steps and entities used to model the composite layup

- The user can define fiber angle, fabric thickness, ply number, fabric material, etc. as parameters

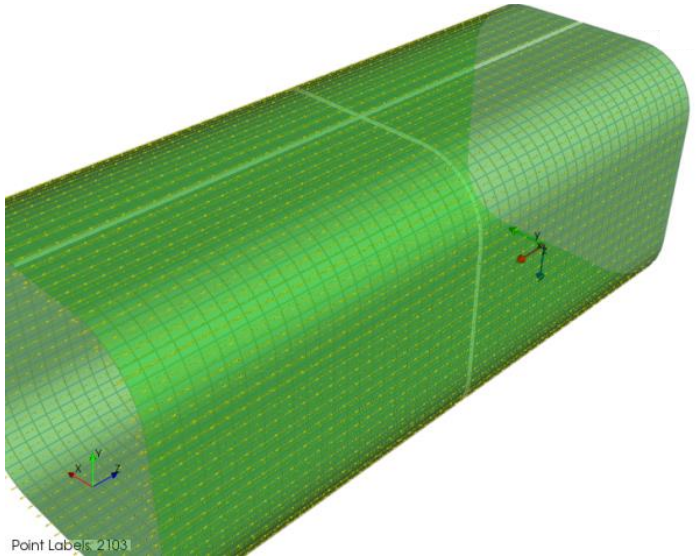
- Output parameters are based on the actual postprocessing



8 Parameters in ANSYS Composite PrepPost

Input Parameter in ANSYS Composite PrepPost

- Modeling Plies provide the following possible input parameter:
  - Ply Active (Yes or No)
  - Global Ply Number
  - Mesh Size
  - Number of Layers
  - Ply Angle
  - Ply Material

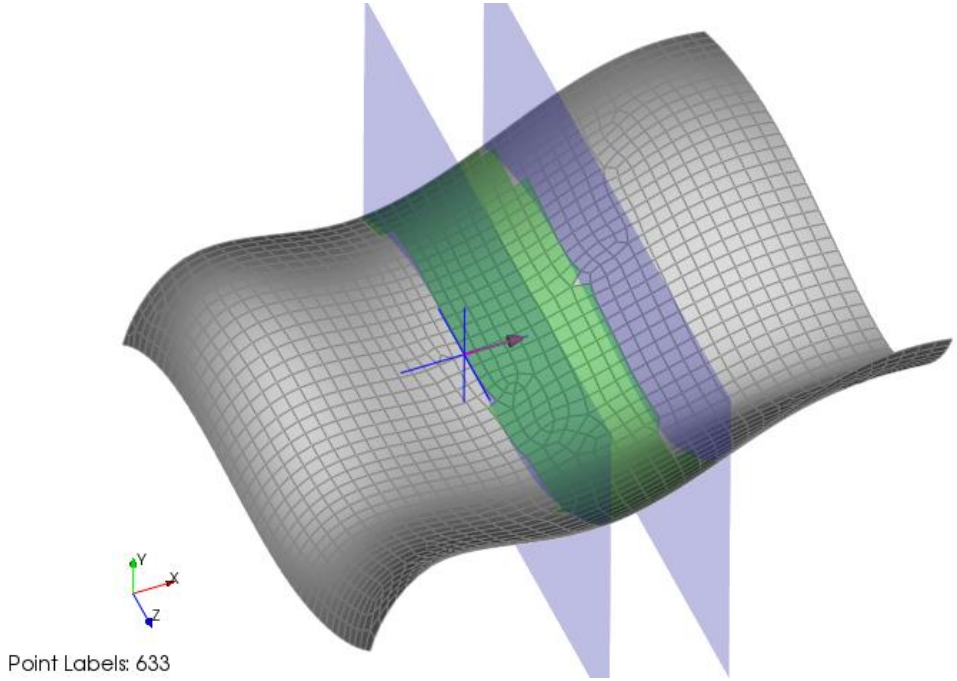


- Fabrics provide the following possible input parameter:
  - Material
  - Thickness
  - Draping Coefficients

8 Parameters in ANSYS Composite PrepPost

Input Parameter in ANSYS Composite PrepPost

- Rules provide the following possible input parameter
  - Include Rule Type (Yes or no)
  - Lower Rule Limit
  - Upper Rule Limit
  - Relative Rule Type (Yes or No)



8 Parameters in ANSYS Composite PrepPost

Output Parameter in ANSYS Composite PrepPost

- Sensors provide the following possible output parameter
  - Area
  - Modeling Ply Area
  - Price
  - Production Ply Area
  - Mass

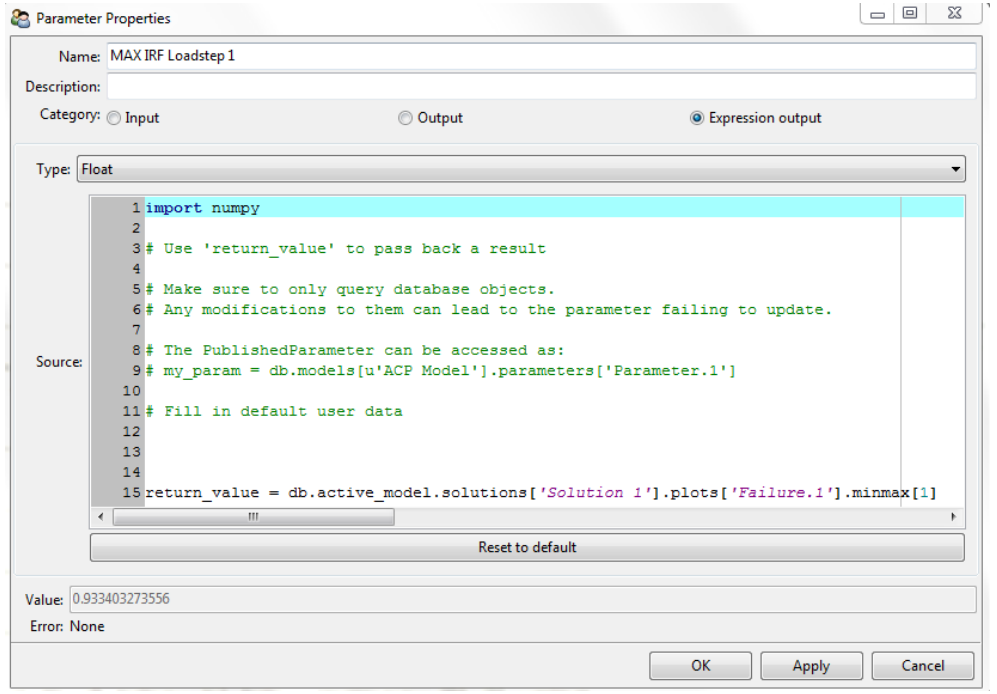
- Adding results of composite specific postprocessing as output parameters is done by expressions. Various information stored in the ACP database can be accessed. However, more sophisticated use of expressions requires a basic knowledge in Python scripting. In most cases the basic use shown on the next slide should provide sufficient possibilities.

8 Parameters in ANSYS Composite PrepPost

Output Parameter in ANSYS Composite PrepPost

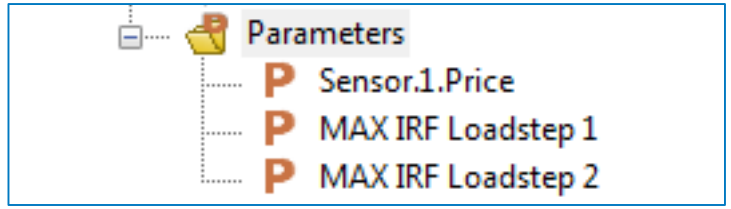
- Expressions provide access to various information stored in ANSYS

  Composite PrepPost database, the following expression is explained here and in the Workshop
- Expression are defined in the parameter property window:



  - Retrieve the maximum value shown in a specific plot (Maximum stresses, failure criteria evaluation (overall or ply wise), …)

db.active_model.solutions['Solution1'].plots['Failure.1'].minmax[1]

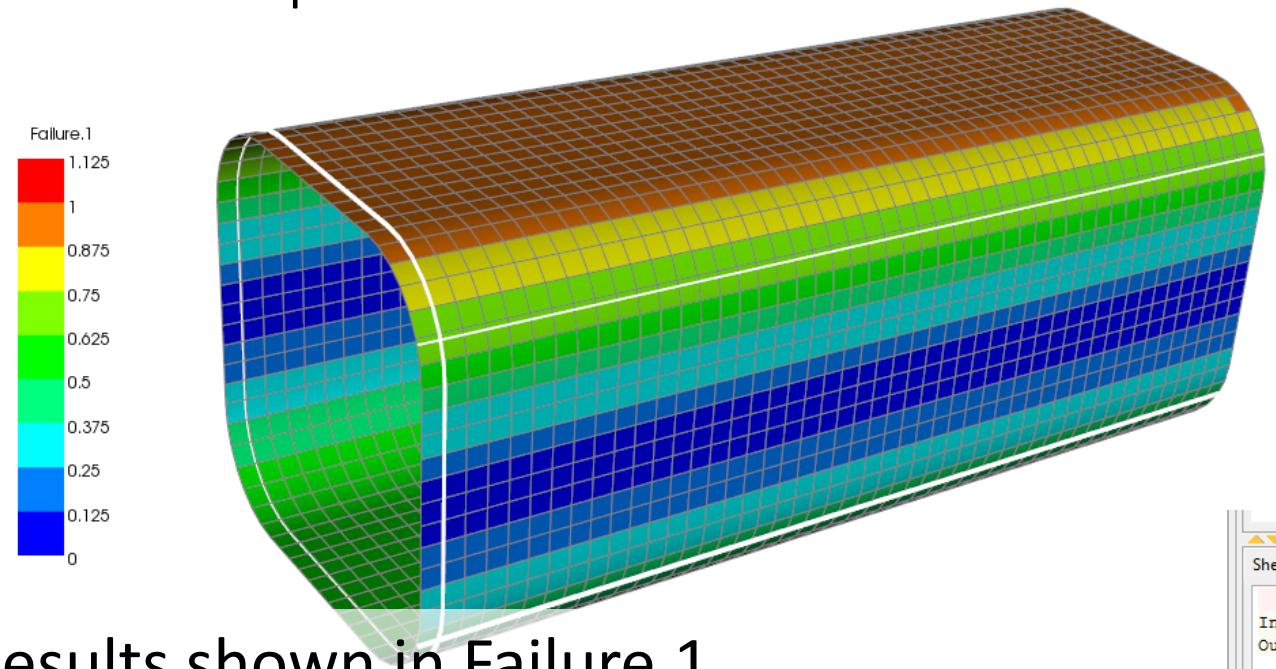


8 Parameters in ANSYS Composite PrepPost

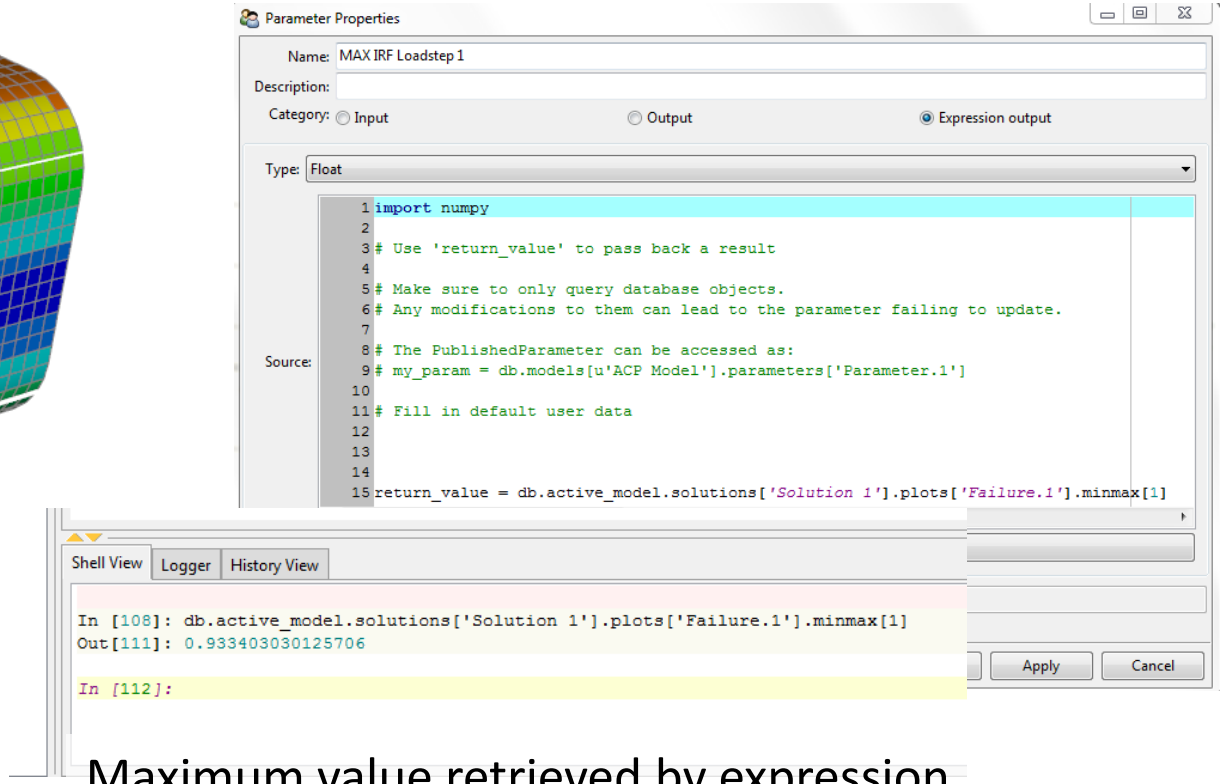
Output Parameter in ANSYS Composite PrepPost

- *db.active_model.solutions['Solution1'].plots['Failure.1'].minmax[1]*

  This expression evaluates the maximum value of the result shown in Failure.1 of the current model.



Results shown in Failure.1
(Inverse Reserve factor of overall failure criteria evaluation)



Maximum value retrieved by expression
MAX IRF = 0.93

8 Parameters in ANSYS Composite PrepPost

- Parameters may be used for design studies to analyze and compare different designs or in combination with design optimization tools.

Fiber Angles (Input)

Composite specific results (stiffness, failure evaluation)