SVS FEM

# Export Displacement History ACT

Your partner in computing

# Description

## Modul: Mechanical

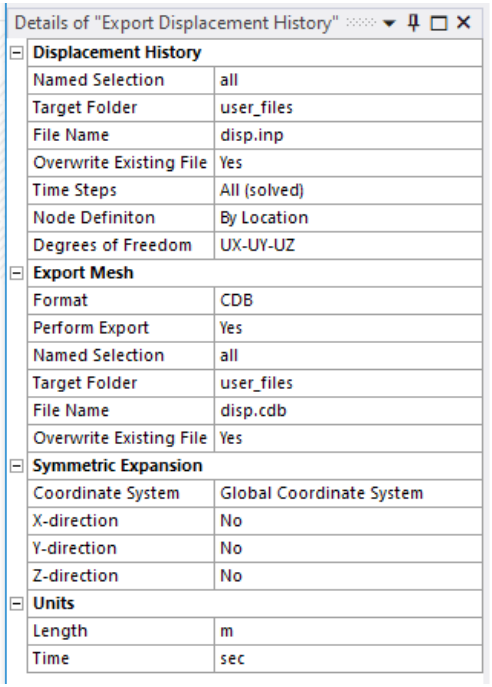
The ACT extension provides transfer of Initial State of selected bodies into following a global model. It allows to easily include complex material-contact-geometrical behaviour springs, clamps, ... in pretended state in the global model. It could by way how to pre-solve initial state (stress-strain) of a model part which corresponds to a complex manufacturing process.

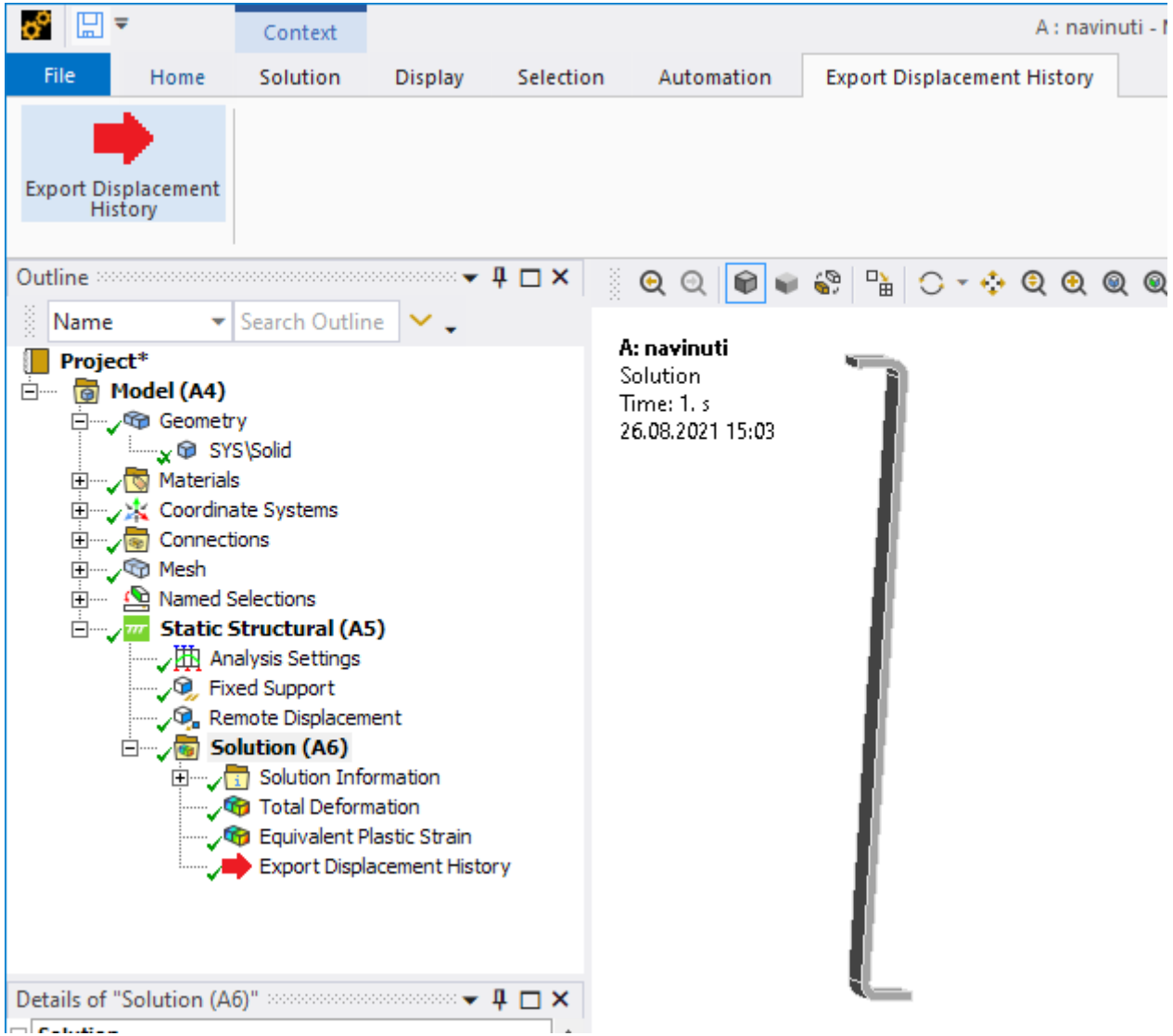
## Background:

The ACT exports ASCI file with APDL curves (tables) of each node over whole solved time history. The curves can be used such as part of APDL input for next analysis in Mechanical or Mechanical APDL module.

# Workflow

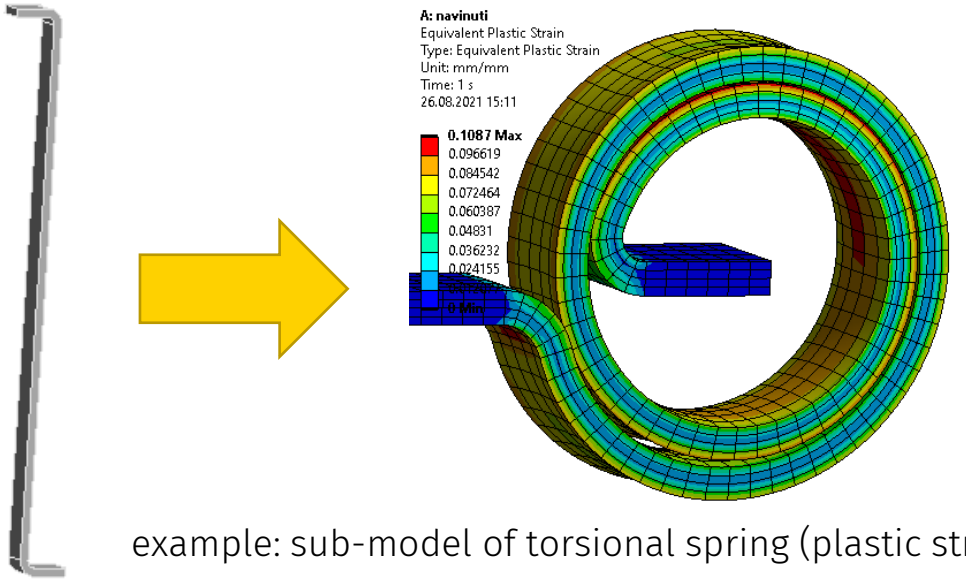
1. Adding of “Export Displacement History” object into sub-model.
2. Selecting of Named Selection name.
3. Evaluating of the displacement file.



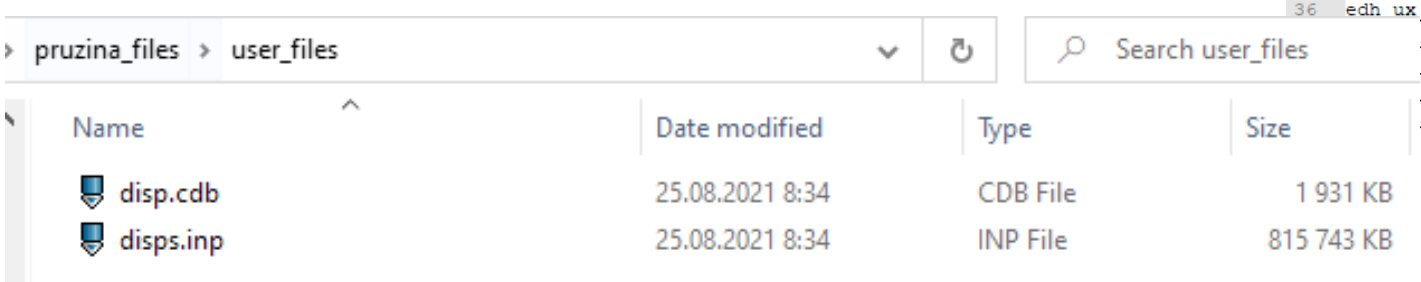
# Exported File

1. APDL tables for each node




example: sub-model of torsional spring (plastic strain)

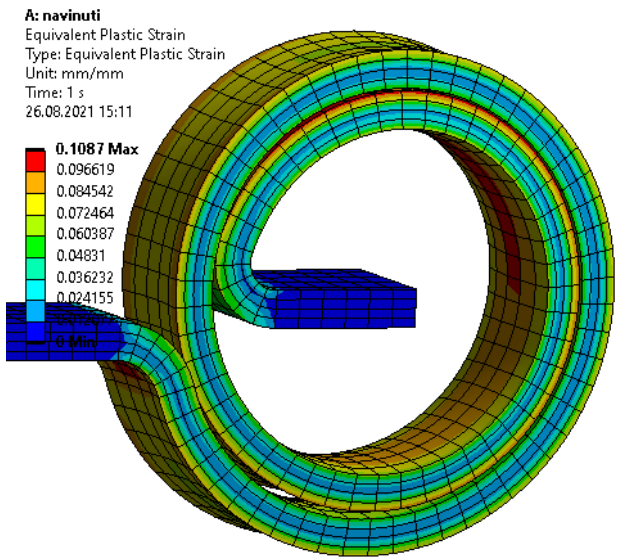
```
/nopr
/com,
/com, act: Export Displacement History (SVS FEM s.r.o., Zdenek Cada, February 2021)
/com, displacement [m] curves in time [sec]

/com, EXPANSION DIRECTION : pXpYpZ

*dim,edh_ux_1_pXpYpZ,TABLE,218,,,TIME
edh_ux_1_pXpYpZ(1,0) = 0.002  $  edh_ux_1_pXpYpZ(1,1) = -0.00253661274909973
edh_ux_1_pXpYpZ(2,0) = 0.004  $  edh_ux_1_pXpYpZ(2,1) = -0.00508154678344727
edh_ux_1_pXpYpZ(3,0) = 0.007  $  edh_ux_1_pXpYpZ(3,1) = -0.00891296672821045
edh_ux_1_pXpYpZ(4,0) = 0.01  $  edh_ux_1_pXpYpZ(4,1) = -0.012759693145752
edh_ux_1_pXpYpZ(5,0) = 0.0145  $  edh_ux_1_pXpYpZ(5,1) = -0.0185508441925049
edh_ux_1_pXpYpZ(6,0) = 0.019  $  edh_ux_1_pXpYpZ(6,1) = -0.024355525970459
edh_ux_1_pXpYpZ(7,0) = 0.0235  $  edh_ux_1_pXpYpZ(7,1) = -0.0301692581176758
edh_ux_1_pXpYpZ(8,0) = 0.03025  $  edh_ux_1_pXpYpZ(8,1) = -0.038880989074707
edh_ux_1_pXpYpZ(9,0) = 0.0326125  $  edh_ux_1_pXpYpZ(9,1) = -0.0419213027954102
edh_ux_1_pXpYpZ(10,0) = 0.034975  $  edh_ux_1_pXpYpZ(10,1) = -0.044957145690918
edh_ux_1_pXpYpZ(11,0) = 0.03851875  $  edh_ux_1_pXpYpZ(11,1) = -0.0494972648620605
edh_ux_1_pXpYpZ(12,0) = 0.0420625  $  edh_ux_1_pXpYpZ(12,1) = -0.0540013046264648
edh_ux_1_pXpYpZ(13,0) = 0.04560625  $  edh_ux_1_pXpYpZ(13,1) = -0.0584850921630859
edh_ux_1_pXpYpZ(14,0) = 0.050921875  $  edh_ux_1_pXpYpZ(14,1) = -0.0651442337036133
edh_ux_1_pXpYpZ(15,0) = 0.0535796875  $  edh_ux_1_pXpYpZ(15,1) = -0.0683672866821289
edh_ux_1_pXpYpZ(16,0) = 0.0562375  $  edh_ux_1_pXpYpZ(16,1) = -0.0717033233642578
edh_ux_1_pXpYpZ(17,0) = 0.06022421875  $  edh_ux_1_pXpYpZ(17,1) = -0.0765799942016602
edh_ux_1_pXpYpZ(18,0) = 0.0642109375  $  edh_ux_1_pXpYpZ(18,1) = -0.0814274826049805
edh_ux_1_pXpYpZ(19,0) = 0.070191015625  $  edh_ux_1_pXpYpZ(19,1) = -0.0884155197143555
edh_ux_1_pXpYpZ(20,0) = 0.07617109375  $  edh_ux_1_pXpYpZ(20,1) = -0.0954204940795898
edh_ux_1_pXpYpZ(21,0) = 0.082151171875  $  edh_ux_1_pXpYpZ(21,1) = -0.102027153015137
edh_ux_1_pXpYpZ(22,0) = 0.08813125  $  edh_ux_1_pXpYpZ(22,1) = -0.10842455291748
edh_ux_1_pXpYpZ(23,0) = 0.09261630859375  $  edh_ux_1_pXpYpZ(23,1) = -0.113148750305176
edh_ux_1_pXpYpZ(24,0) = 0.0971013671875  $  edh_ux_1_pXpYpZ(24,1) = -0.117612930297852
edh_ux_1_pXpYpZ(25,0) = 0.10158642578125  $  edh_ux_1_pXpYpZ(25,1) = -0.122031623840332
edh_ux_1_pXpYpZ(26,0) = 0.106071484375  $  edh_ux_1_pXpYpZ(26,1) = -0.126226097106934
edh_ux_1_pXpYpZ(27,0) = 0.11055654296875  $  edh_ux_1_pXpYpZ(27,1) = -0.130366836547852
edh_ux_1_pXpYpZ(28,0) = 0.117284130859375  $  edh_ux_1_pXpYpZ(28,1) = -0.136053604125977
_1_pXpYpZ(29,0) = 0.119806976318359  $  edh_ux_1_pXpYpZ(29,1) = -0.138067047119141
_1_pXpYpZ(30,0) = 0.122329821777344  $  edh_ux_1_pXpYpZ(30,1) = -0.140114349365234
_1_pXpYpZ(31,0) = 0.12611408996582  $  edh_ux_1_pXpYpZ(31,1) = -0.14302262878418
_1_pXpYpZ(32,0) = 0.129898358154297  $  edh_ux_1_pXpYpZ(32,1) = -0.14581266784668
```

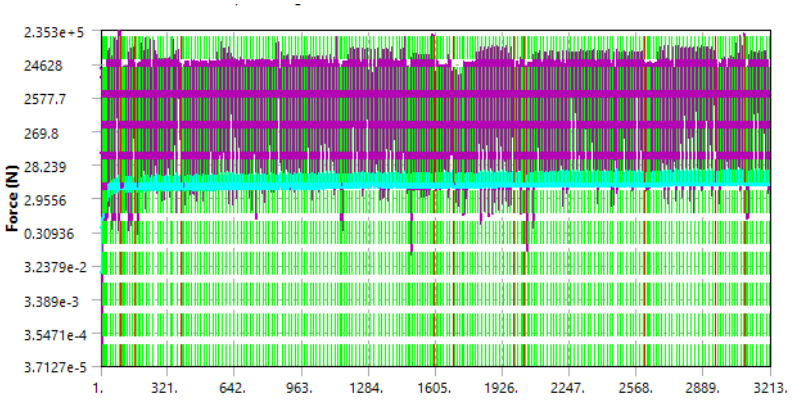


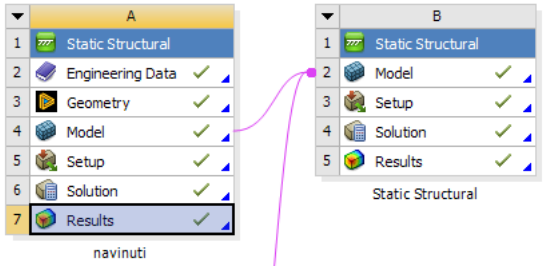
# Example of workflow

1. Sub-model
2. Global model

sub-model: 3213 iteration (manufacturing process)

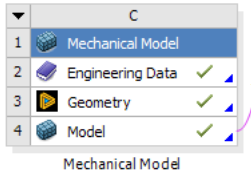


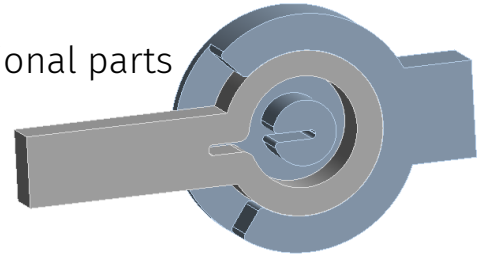





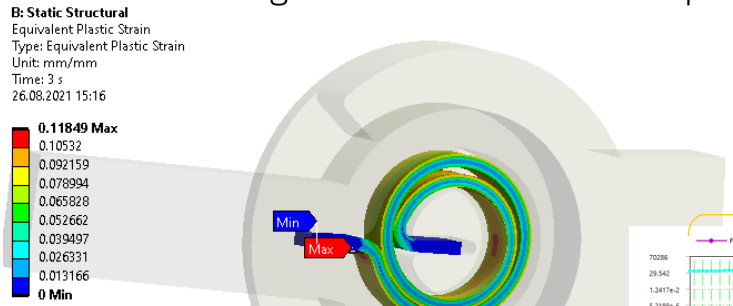




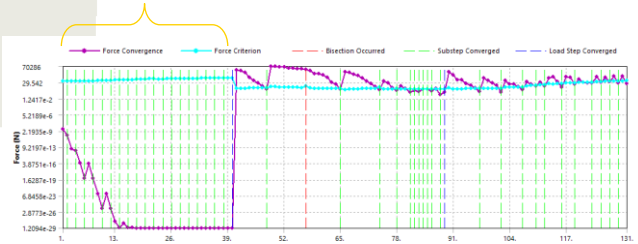

additional parts



global model: torsional spring + additional parts



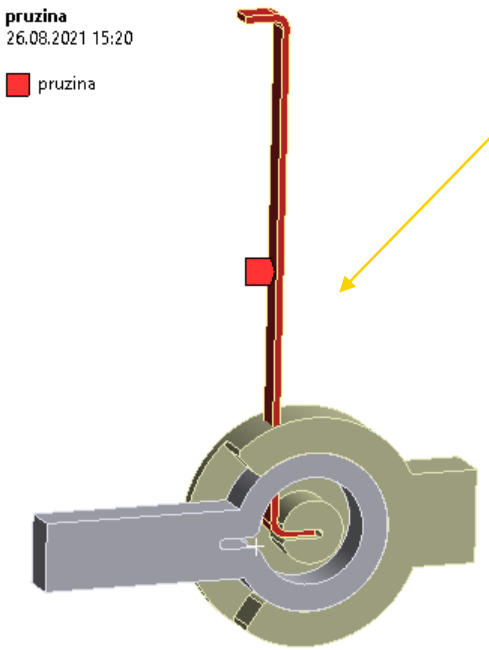

manufacturing process

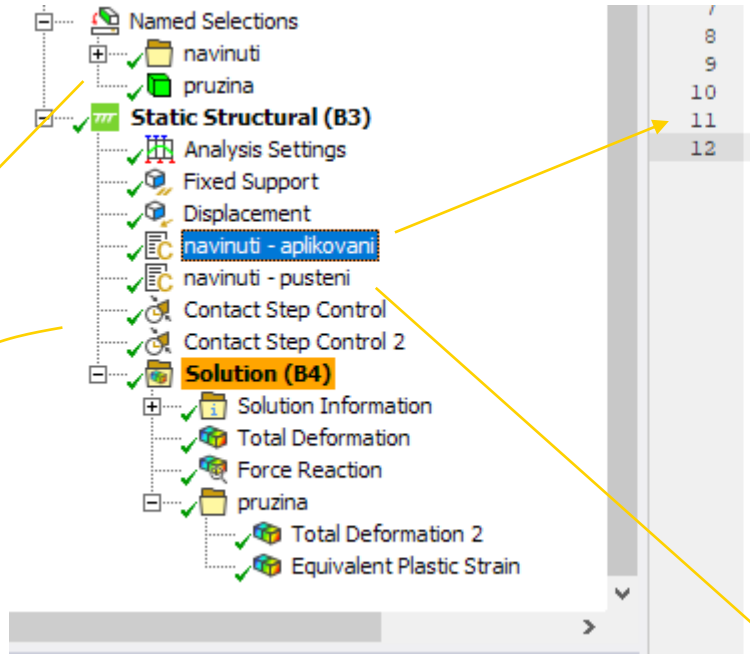



Public | Export Displacement History

# Applying of Displacement in Global Model

1. Simple reference to “disp.inp” file
2. Deleting of boundary condition in second step
3. Activating of contacts




```
cmsel,s,pruzina
/inp,'e:\TozniPruzina\pruzina_files\user_files\disps.inp',''
allsel
```

| Definition | |
|---|---|
| Suppressed | No |
| Step Selection Mode | By Number |
| Step Number | 2. |
| Target | Mechanical APDL |
| Issue Solve Command | Yes |

Details of "Contact Step Control"

| Scope | |
|---|---|
| Scoping Method | Contact Region |
| Contact Region | Frictional - vnitrni |
| **Definition** | |
| ID (Beta) | 123 |
| Type | Contact Step Control |
| Normal Stiffness | From Contact Region |
| Suppressed | No |
| **Step Controls** | |
| Current Step | 2 |
| Status | Alive |

```
cmsel,s,pruzina
nsle
ddele,all,all,,,1
allsel
```



SVS FEM

# Thank you for using SVS FEM ACTs

SVS FEM

www.svsfem.cz