

True-Load Enhancements

2020-12-01

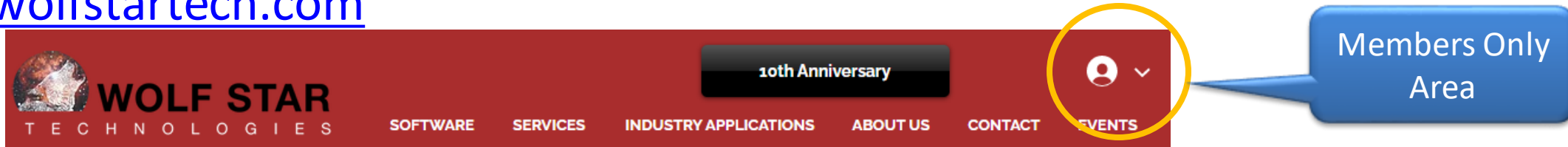


Tim Hunter



Enhancements Overview

- Major Release – Re-Introduction of True-LDE!!!
 - License offered free to all users until 2020-06-01
 - Give it a try and Enjoy!
- Video demonstrations of True-LDE in the Members Only area on www.wolfstartech.com



- Most of the enhancements discussed in this document are updates in performance and usability
- Some new features have been added.
- 34 Enhancements, 4 Bug Fixes



Overview – Major Enhancements

- True-LDE – Linear Dynamic Events
- New icons for True-QSE, Pre-Test, Post-Test, True-LDE
- Fiber Optic Strain Gauge cabling
- Import GOIs added to standard gauge import
- Import of Gauge / GOI names supported
- Export of Gauge number / Gauge Name to GaugeLines CSV file
- More math added to TFU Manager

Enhancements - Overview



Bug Fixes



Details



True-LDE





Details

Update / Install

True-Load Icons



Fiber Optic Cabling



Write Gauge Lines



Import Gauge Line Improvements



Ansys WorkBench Updates



Abaqus Plug-in Updates



Major Features

Solver Specific

Utilitarian Improvements

TFU Mgr GUI Update



Cross Plots - Available in tfuTools



Save Animation



On Screen Ruler



Measure Utils



Add Load Checks



Group Sorting



Key Plane



PSD to Time



Bulk Import TFU files



TFU Mathematics



Safety Save



Bug Fixes





Bugs

Release Level	Module	Type	Description
12/1/2020	POST	Bug	ShellsOnly Flag not written to QSE file in Post
12/1/2020	POST	Bug	Two SimMes files (one with spaces / one without) are being written -- we only want one (with spaces)
12/1/2020	PRE	Bug	Lots of GUI issues in GOI form ... we need to clean up.
12/1/2020	PRE	Bug	When loading Open as VTFx, native FEA groups are not loaded properly
12/1/2020	QSE	Bug	Save as FFT does not update the event table.
12/1/2020	QSE	Bug	When loading Open as VTFx, native FEA groups are not loaded properly

All of these issues are fixed (except where noted). These are fairly self-explanatory

These two issues are the same issue. Details on the next slide.

This issue is being worked on by Ceetron. Fix is expected in Q1 2021.



Groups issue with LoadShellsOnly and OpenAsVTFx

The image displays four screenshots of the Wolf Star Technologies True-Tools software interface, illustrating the issue with Native FEA Groups when using LoadShellsOnly and OpenAsVTFx options.

The top-left and bottom-left screenshots show the software interface with the following settings:

- ☐ Load Shells Only
- ☐ Open as VTFx

The top-right and bottom-right screenshots show the software interface with the following settings:

- ☐ Load Shells Only
- ☒ Open as VTFx

The bottom-right screenshot also shows the following settings:

- ☒ Load Shells Only
- ☒ Open as VTFx

A red callout box points to the bottom-right screenshot with the text:

Native FEA Groups are not supported for LoadShellsOnly and OpenAsVTFx

Enhancements - Overview





Enhancements – True-Load Environment

Release Level	Module	Type	Description
12/1/2020	ALL	Enhancement	Add MP4 file output to Results Manager
12/1/2020	ALL	Enhancement	Fix ruler to be intuitive when spun
12/1/2020	ALL	Enhancement	Sort groups in Group Manager
12/1/2020	ALL	Enhancement	Add to plane picker: Key In
12/1/2020	ALL	Enhancement	Add 3 Pt Arc to Measure Utils
12/1/2020	ALL	Enhancement	Add MidPt to Measure Utils
12/1/2020	ALL	Enhancement	Add Coordinates of Pt to Measure Utils

See Details on these

Release Level	Module	Type	Description
12/1/2020	DIM	Enhancement	Remove last floppy from T-L!
12/1/2020	DIM	Enhancement	Move safety save btn to standard location



Enhancements – TFU Mgr

Release Level	Module	Type	Description
12/1/2020	TFU	Enhancement	Make Cross Plot a tfuTools function
12/1/2020	TFU	Enhancement	Fix filter to make data Real before processing (numpy.real() or y.real())
12/1/2020	TFU	Enhancement	Add sqrt, sqr, sqrt(sumSqr)
12/1/2020	TFU	Enhancement	Add PSD to Time to tfuTools
12/1/2020	TFU	Enhancement	Add PSD to Time function to GUI
12/1/2020	TFU	Enhancement	Bulk import TFU files
12/1/2020	TFU	Enhancement	After CSV (and other import) print "xxxx.csv imported"
12/1/2020	TFU	Enhancement	Add AVG Functions to GUI
12/1/2020	TFU	Enhancement	Add function to create 1/y
12/1/2020	TFU	Enhancement	UNV Read - fix issue with trailing zeroes
12/1/2020	TFU	Enhancement	UNV Read - Allow for even and uneven spaced data

See Details on these



Enhancements - Pre

Release Level	Module	Type	Description
12/1/2020	PRE	Enhancement	"Add More Gauges" displays gauges in all details ... need to obey GUI setting
12/1/2020	PRE	Enhancement	Update eMat should make gauges valid
12/1/2020	PRE	Enhancement	When importing gauges from TLD add option (CheckBox) for importing GOIs
12/1/2020	PRE	Enhancement	When importing gauges / GOIs, import the names too
12/1/2020	PRE	Enhancement	Add Row to table check to see if load is already there
12/1/2020	PRE	Enhancement	Add all steps to table checks to see if loads are already in table.
12/1/2020	PRE	Enhancement	When deleting loads, activate the save button
12/1/2020	PRE	Enhancement	Add Fiber-Optic B-spline Utility

See Details on these



Enhancements - QSE

See Details on these

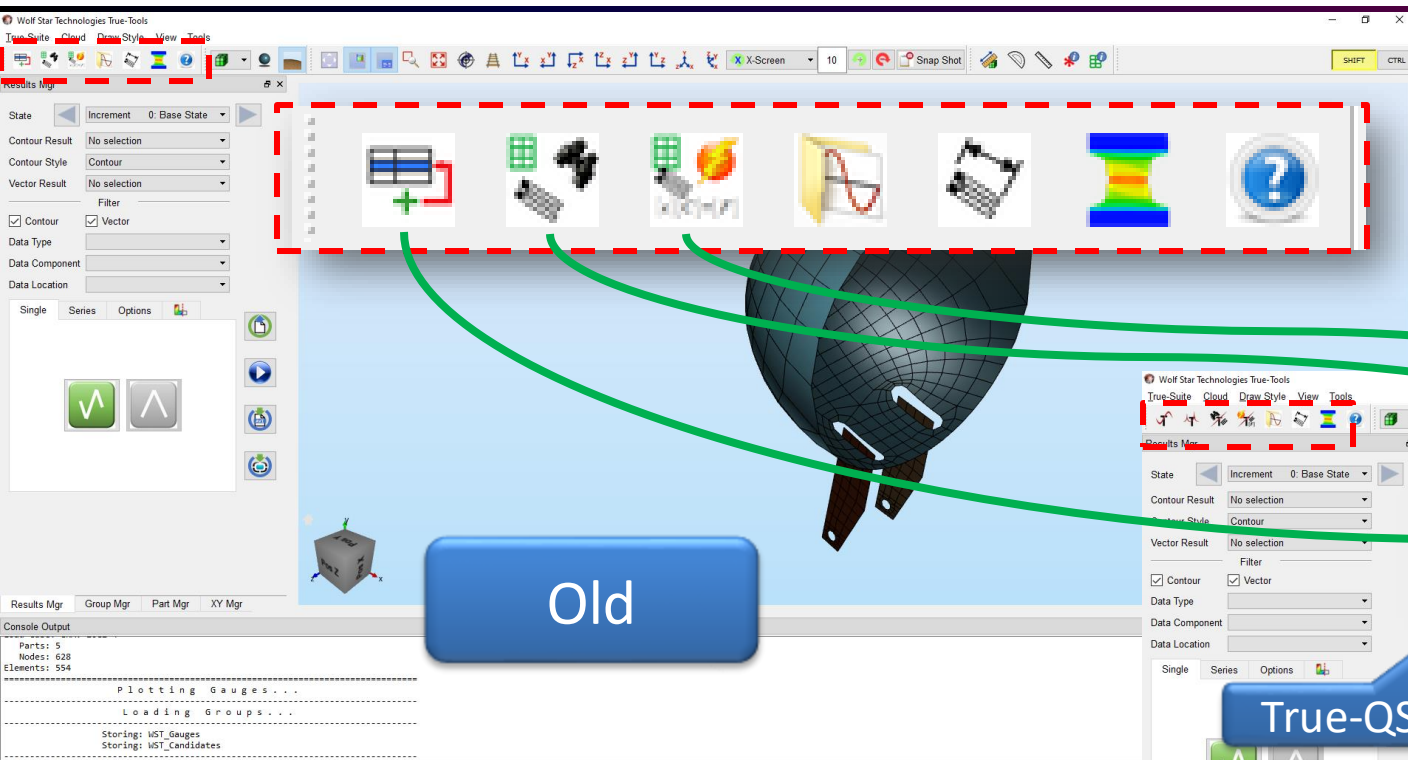
Release Level	Module	Type	Description
12/1/2020	QSE	Enhancement	Fix imaginary number issue when saving functions (Reaction Forces) in Nodal and Elemental Functions
12/1/2020	QSE	Enhancement	Fix element selection issues on multiple GOI runs
12/1/2020	QSE	Enhancement	Move safety save btn to standard location

True-Load Icons

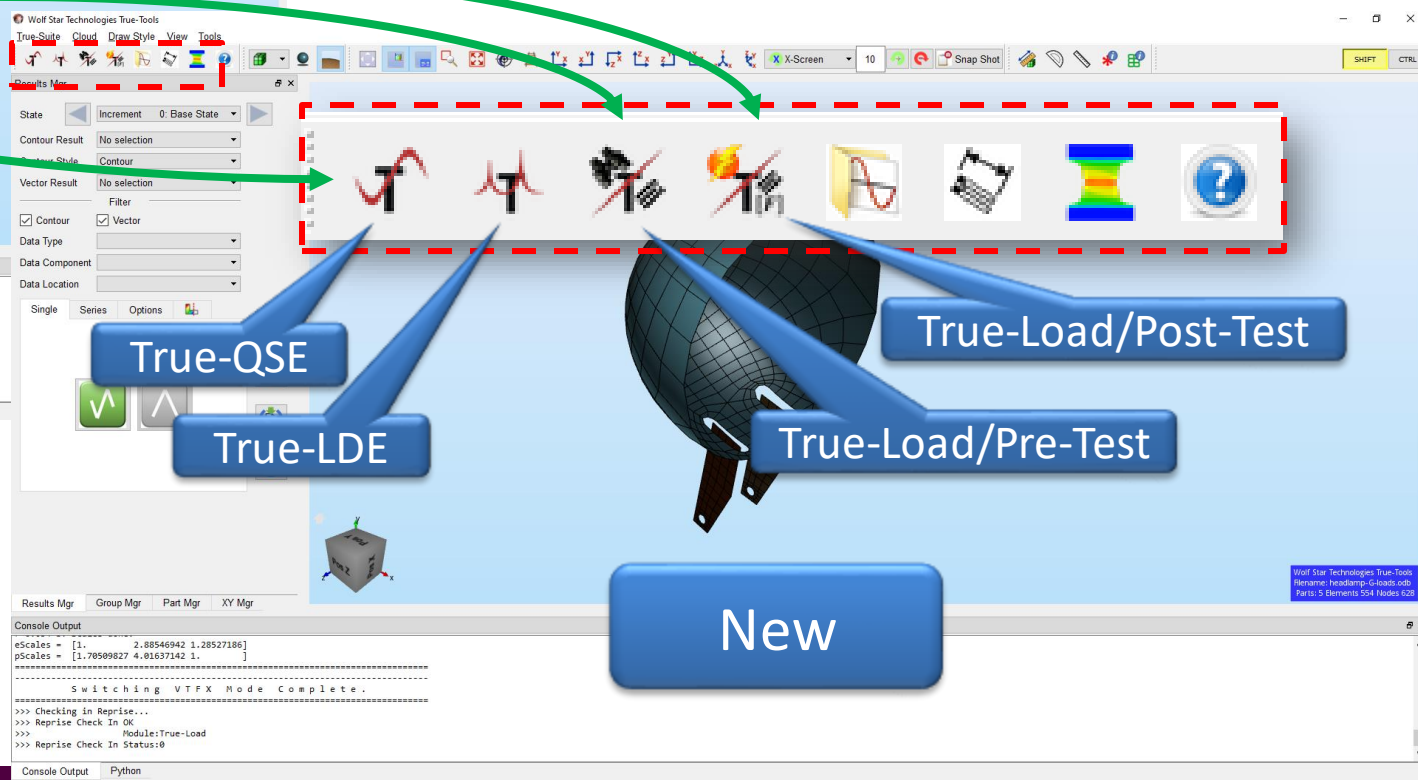




True-Load Application Icons have changed



Old



True-QSE

True-LDE

True-Load/Post-Test

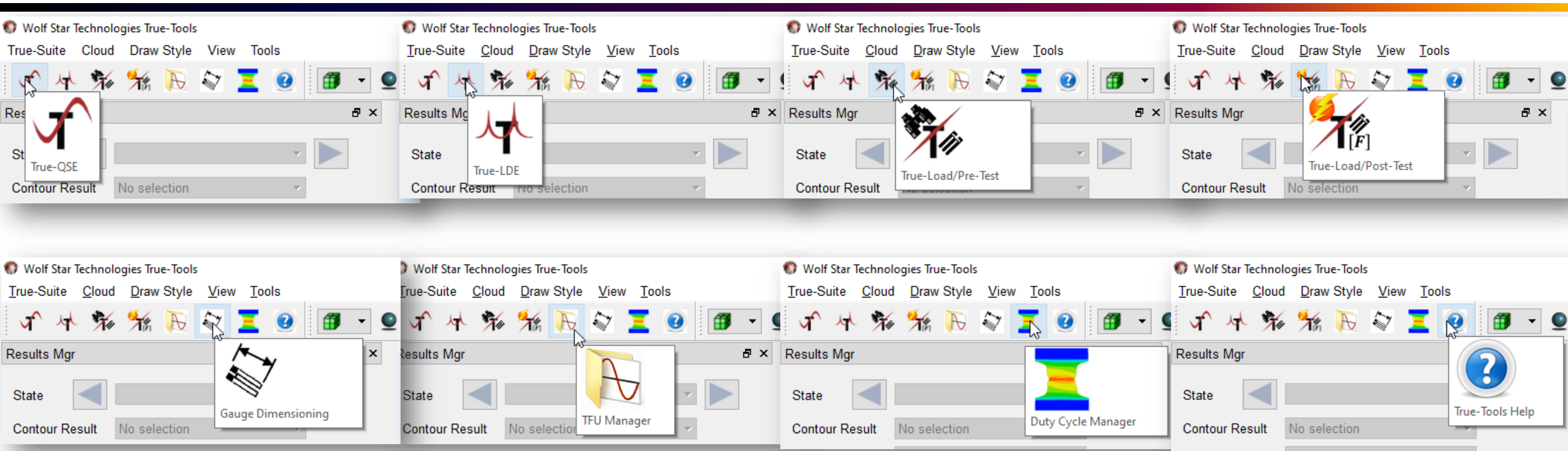
True-Load/Pre-Test

New

```
Console Output
eScales = [1. 2.88546942 1.28527186]
pScales = [1.70509827 4.01637142 1. ]
Switching VTFX Mode Complete.
>>> Checking in Reprise...
>>> Reprise Check In OK
>>> Module:True-Load
>>> Reprise Check In Status:0
```

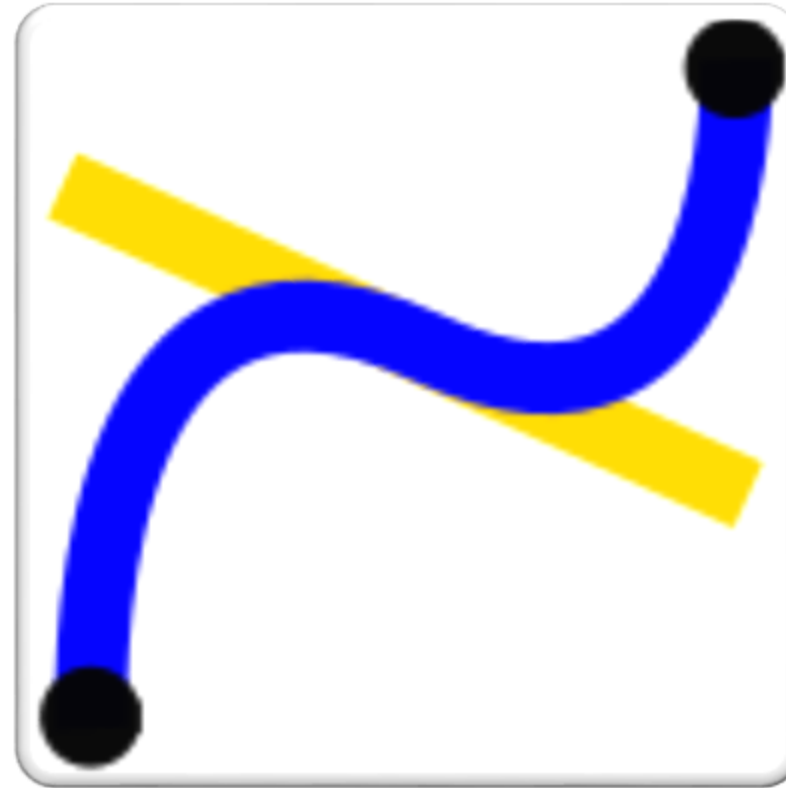


New Tool Tips with Large Icons



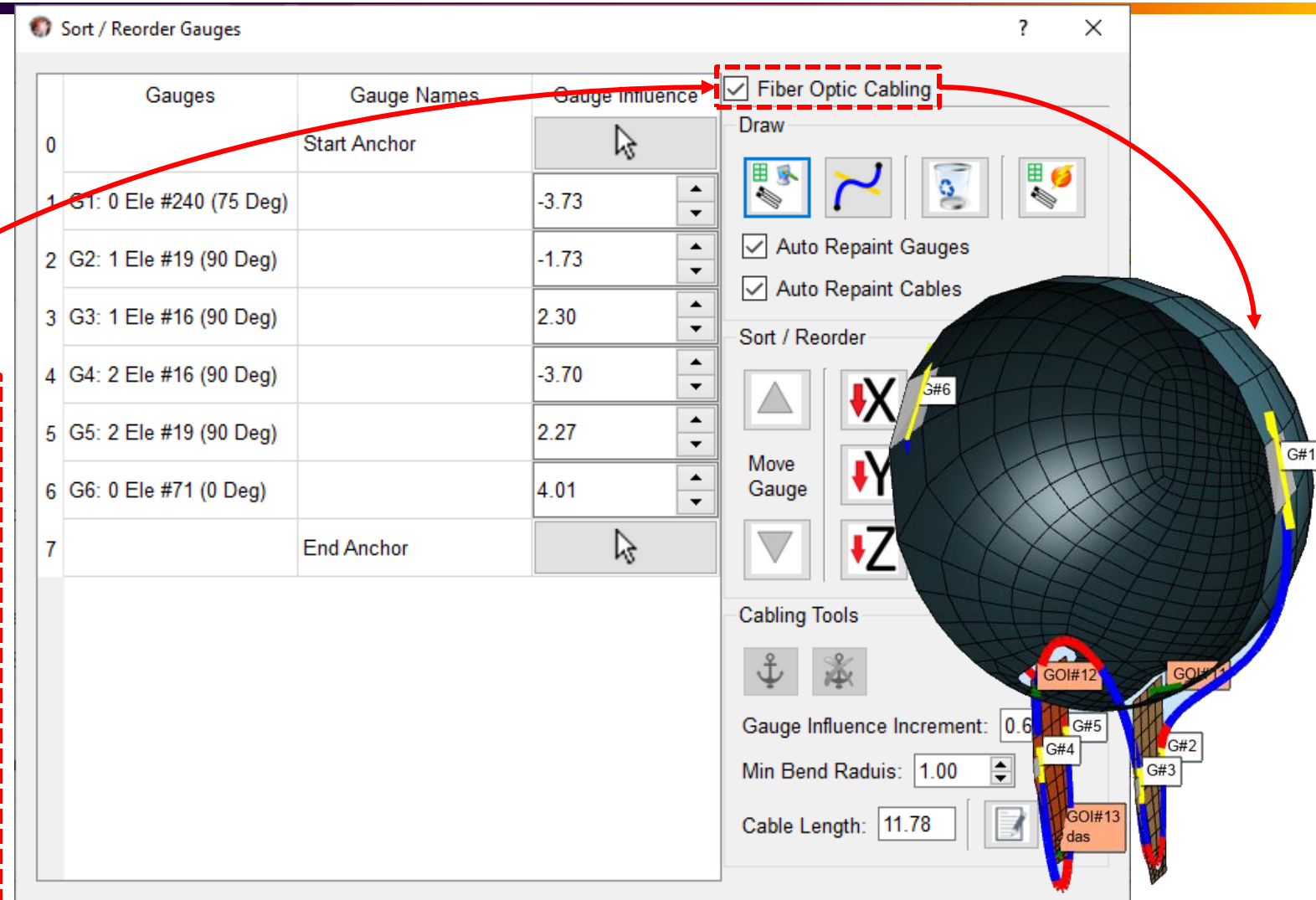
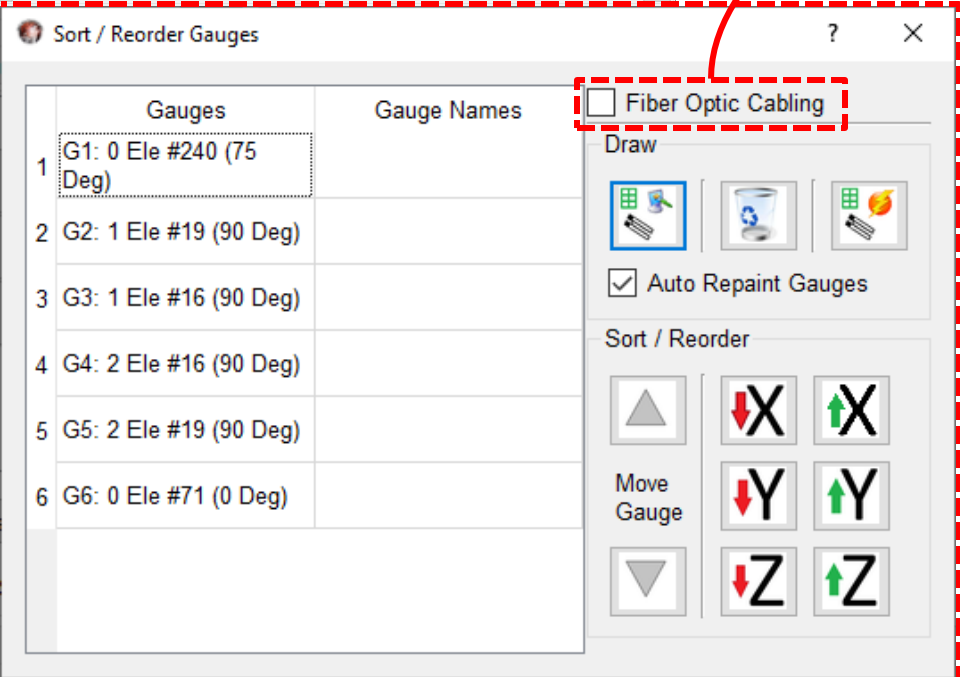
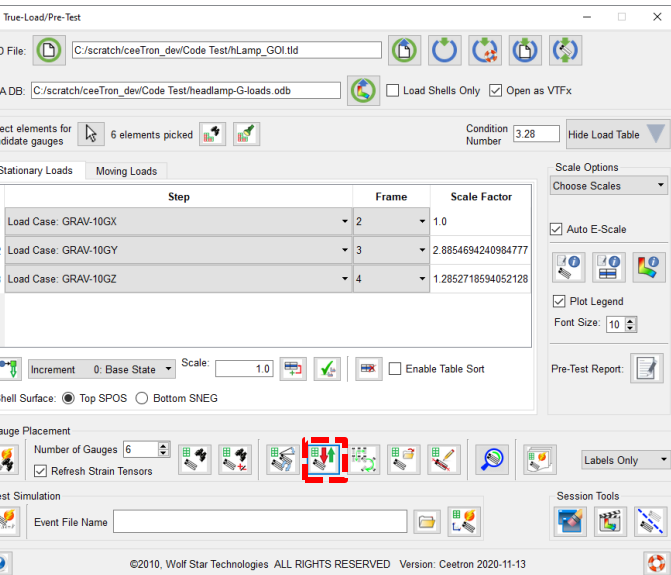
When hovering over the True-Load Application Icons, a large Icon shows in the Tool Tip text.

Fiber Optic Cabling





Fiber Optic Cabling





Fiber Optic Cabling

Sort / Reorder Gauges

Gauges	Gauge Names	Gauge Influence
0	Start Anchor	
1	G1: 0 Ele #240 (75 Deg)	-3.73
2	G2: 1 Ele #19 (90 Deg)	-1.73
3	G3: 1 Ele #16 (90 Deg)	2.30
4	G4: 2 Ele #16 (90 Deg)	-3.70
5	G5: 2 Ele #19 (90 Deg)	2.27
6	G6: 0 Ele #71 (0 Deg)	4.01
7	End Anchor	

☒ Fiber Optic Cabling

Draw

☒ Auto Repaint Gauges

☒ Auto Repaint Cables

Sort / Reorder

Move Gauge

Cabling Tools

Gauge Influence Increment: 0.61

Min Bend Radius: 1.00

Cable Length: 11.78

Start / End Anchors

Add / Delete
Intermediate Anchors

Specify Minimum
Bend Radius

Fiber Optic Cable
Specification Report
(Next Slide)



Fiber Optic Cabling

Sort / Reorder Gauges

Gauges	Gauge Names	Gauge Influence
0	Start Anchor	
1	G1: 0 Ele #240 (75 Deg)	-3.73
2	G2: 1 Ele #19 (90 Deg)	-1.73
3	G3: 1 Ele #16 (90 Deg)	2.30
4	G4: 2 Ele #16 (90 Deg)	-3.70
5	G5: 2 Ele #19 (90 Deg)	2.27
6	G6: 0 Ele #71 (0 Deg)	4.01
7	End Anchor	

☒ Fiber Optic Cabling

Draw

☒ Auto Repaint Gauges

☒ Auto Repaint Cables

Sort / Reorder

Move Gauge

Cabling Tools

Gauge Influence Increment: 0.61

Min Bend Radius: 1.00

Cable Length: 11.78

True-Load Fiber Optic Cabling Report			
Date Generated:	11/18/2020 10:25		
Total Cable Length:	11.78		
Linear Position	Number	Name	Details
0.0000	G1		Part 0 Ele #240 (75 Deg)
2.9857	G2		Part 1 Ele #19 (90 Deg)
4.4537	G3		Part 1 Ele #16 (90 Deg)
6.7917	G4		Part 2 Ele #16 (90 Deg)
8.9785	G5		Part 2 Ele #19 (90 Deg)
11.7838	G6		Part 0 Ele #71 (0 Deg)

Write Gauge Lines





Write Gauge Lines GUI - Improvements

True-Load/Pre-Test

TLD File:

FEA DB:

Select elements for candidate gauges: 6 elements picked

Condition Number: 3.28

Hide Load Table

Stationary Loads | Moving Loads

	Step	Frame	Scale Factor
1	Load Case: GRAV-10GX	2	1.0
2	Load Case: GRAV-10GY	3	2.885469424
3	Load Case: GRAV-10GZ	4	1.285271859

Scale Options: Choose Scales

Export Type: ☒ Gauge Line CSV ☐ 3 Point CSV ☐ Punch XML ☐ 3D STL ☐ Process GOIs

Output Folder:

Apply Cancel

Increment: 0: Base State Scale: 1.0

Shell Surface: ☒ Top SPOS ☐ Bottom SNEG

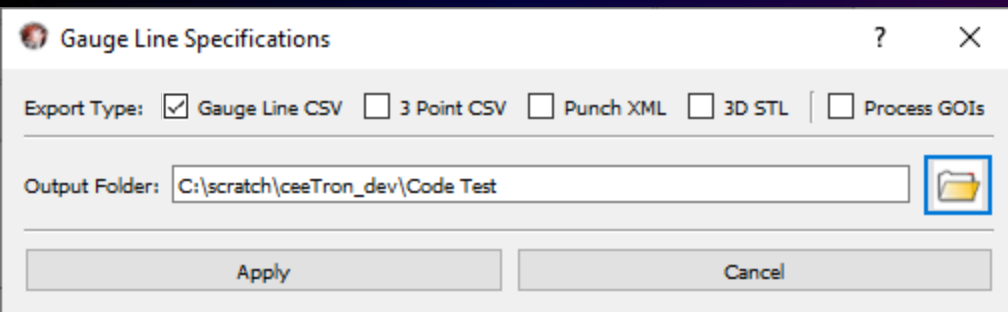
Gauge Placement: Number of Gauges: 6

Test Simulation: Event File Name:

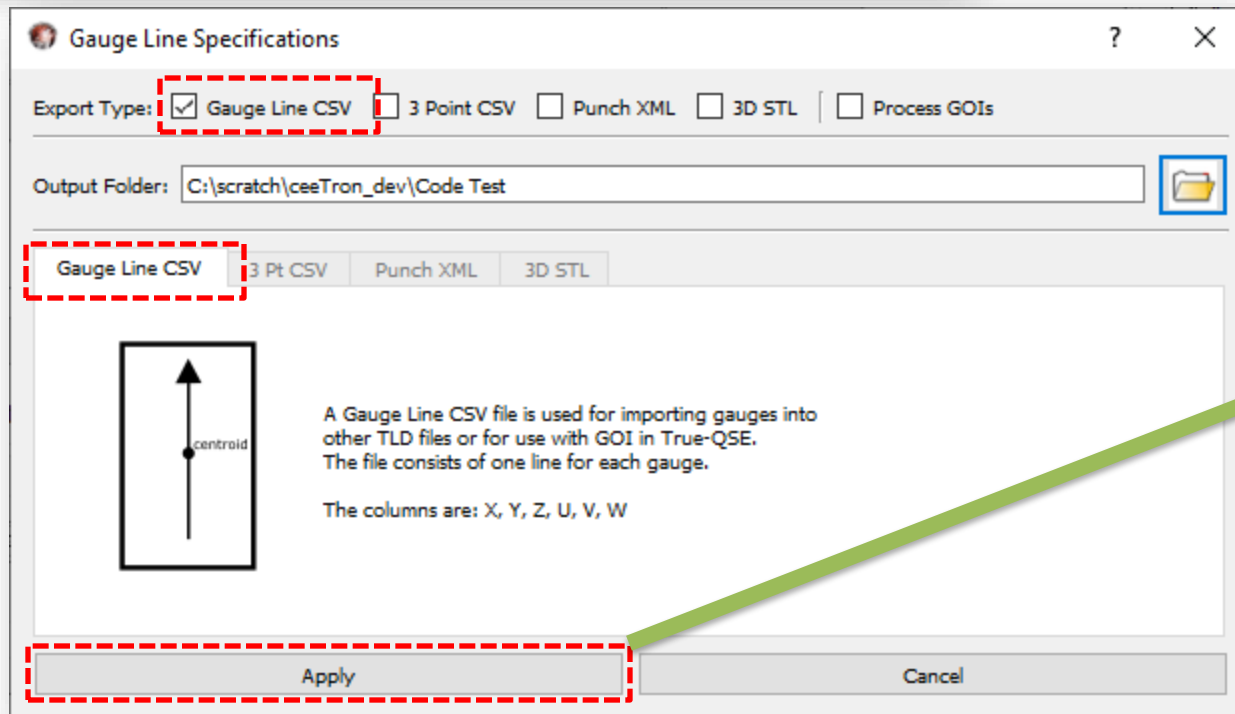
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GaugeLines.csv



Creates GaugeLines.csv
file used for importing
and for GOI in True-QSE



Gauge Number

Gauge Name

	A	B	C	D	E	F	G	H
1	-0.17245	0.439797	-1.52835	0.027367	0.962485	0.269953	1	Left Bucket
2	-0.7996	-2.12722	-0.39777	0.3018	0.953302	-0.01151	2	
3	-0.44026	-2.23759	-0.41889	0.302915	0.952947	-0.01158	3	
4	-0.4401	-2.23597	0.424782	0.302695	0.953015	0.011737	4	
5	-0.79945	-2.12568	0.403359	0.301579	0.95337	0.01167	5	
6	-0.17587	0.369835	1.543111	0.001468	0.973565	-0.22841	6	Right Bucket

Import Gauge Line Improvements





GOIs may be imported from TLD files

True-Load/Pre-Test

TLD File:

FEA DB:

☐ Load Shells Only ☒ Open as VTFx

Select elements for candidate gauges 6 elements picked

Stationary Loads Moving Loads

Step
1 Load Case: GRAV-10GX
2 Load Case: GRAV-10GY
3 Load Case: GRAV-10GZ

Increment 0: Base State Scale: 1.0

Shell Surface: ☒ Top SPOS ☐ Bottom SNEG

Gauge Placement

Number of Gauges 6

☐ Refresh Strain Tensors

Test Simulation

Event File Name

Session Tools

Load Old Gauges

Old Gauge File:

☐ Merge Gauges ☒ Global Search ☒ ZIP selection ☐ Import GOIs

Okay Cancel

Not available for CSV files

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Import Gauges supports Gauge Names too

AutoSave ☐ Off

File Home Insert Page Layout Formulas Data View

Clipboard Font

Calibri 11

B I U

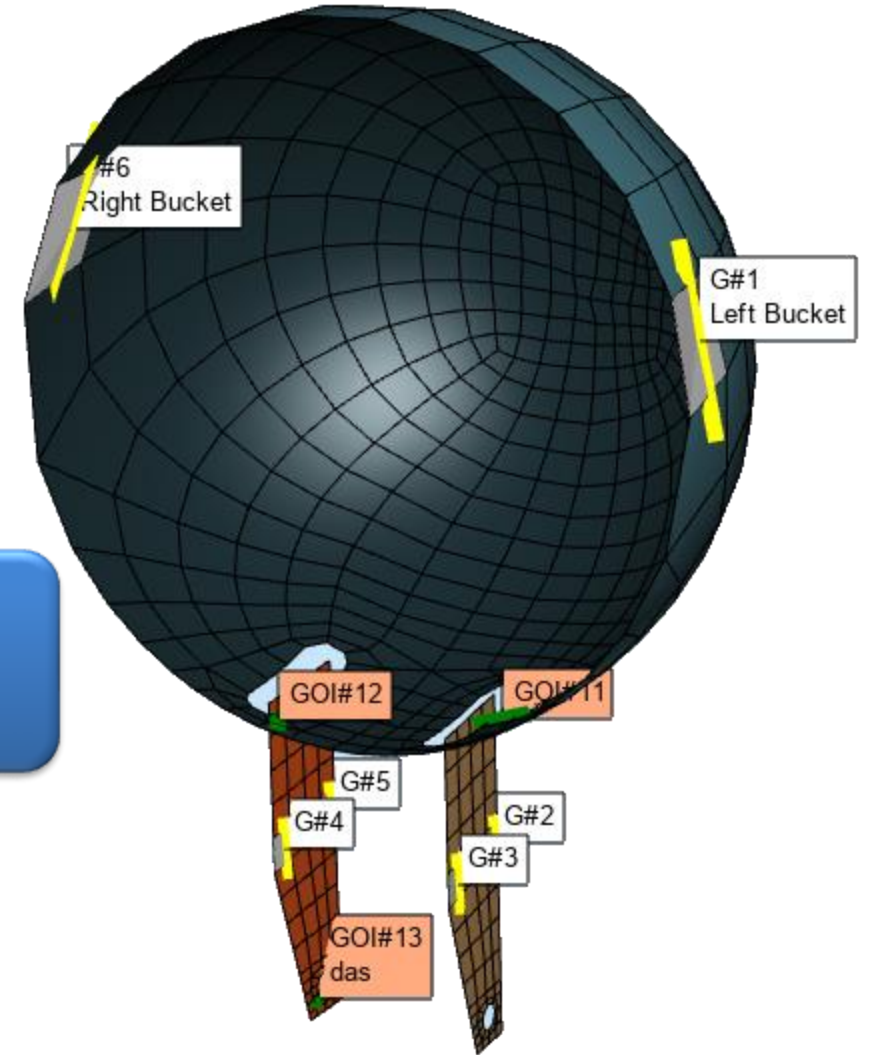
H11

	A	B	C	D	E	F	G	H
1	-0.17245	0.439797	-1.52835	0.027367	0.962485	0.269953	1	Left Bucket
2	-0.7996	-2.12722	-0.39777	0.3018	0.953302	-0.01151	2	
3	-0.44026	-2.23759	-0.41889	0.302915	0.952947	-0.01158	3	
4	-0.4401	-2.23597	0.424782	0.302695	0.953015	0.011737	4	
5	-0.79945	-2.12568	0.403359	0.301579	0.95337	0.01167	5	
6	-0.17587	0.369835	1.543111	0.001468	0.973565	-0.22841	6	Right Bucket

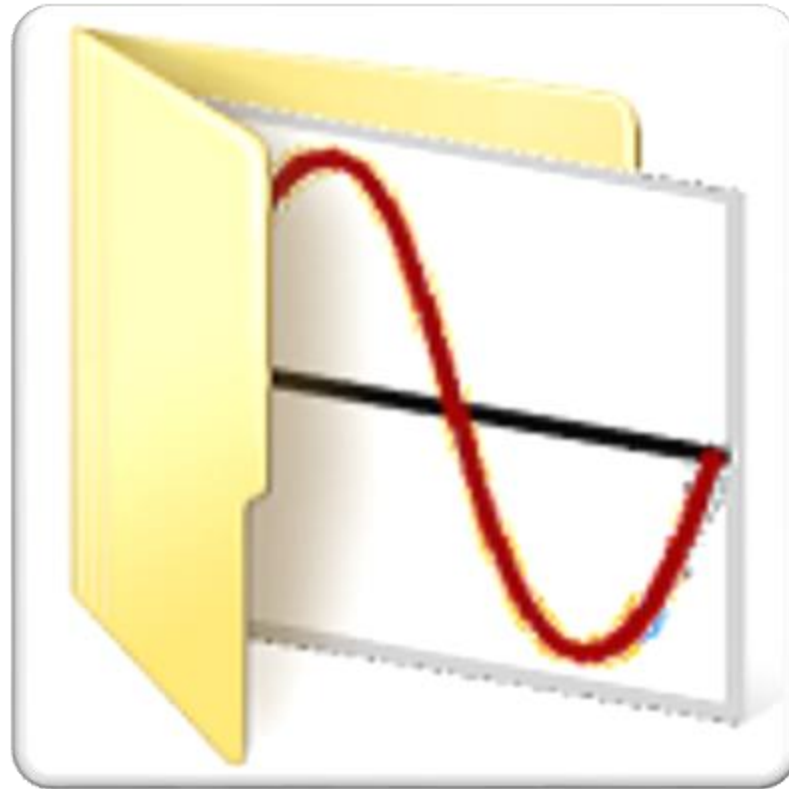
Gauge Number

Gauge Name

Names in CSV and TLD file are supported

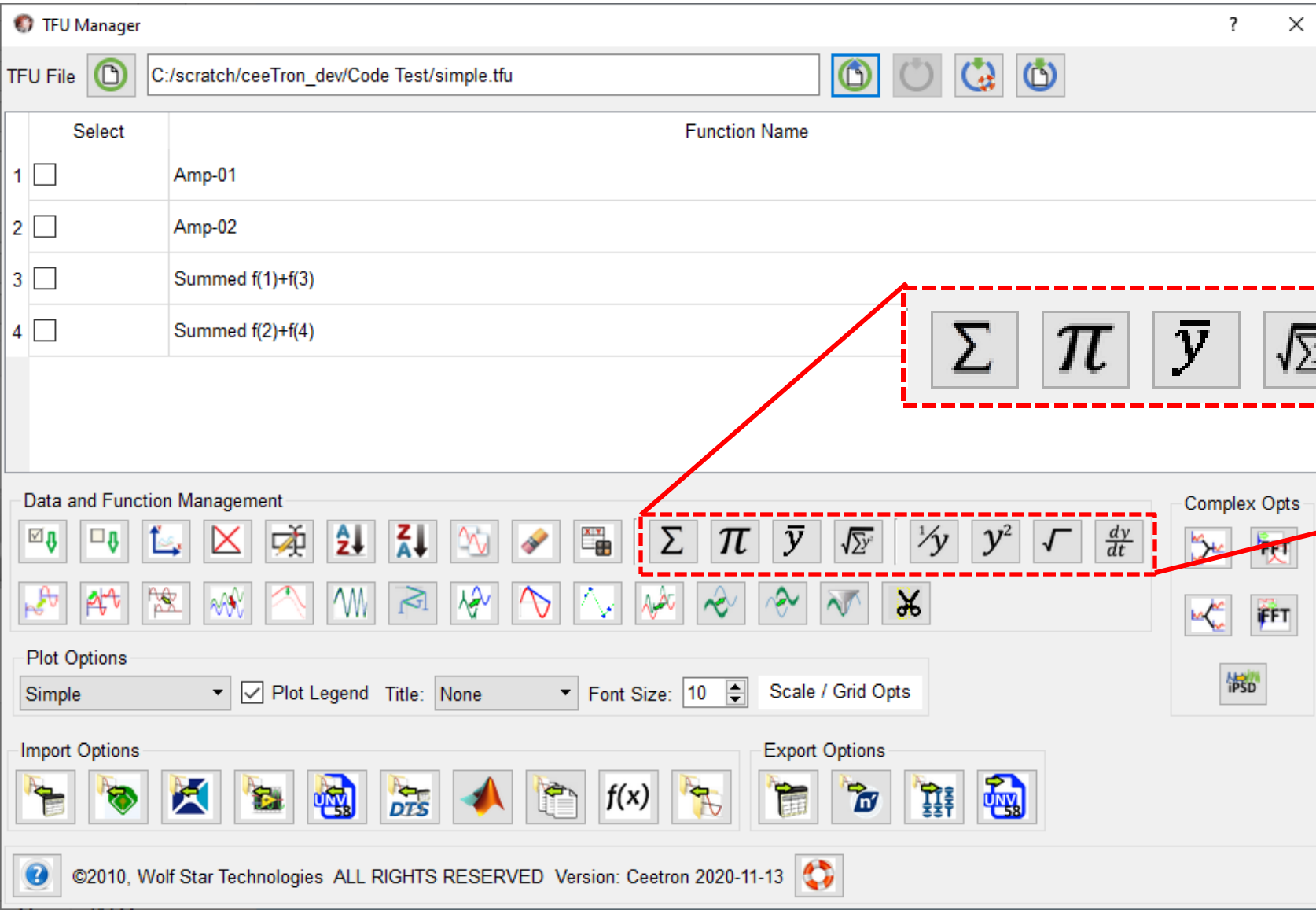


TFU Mathematics





TFU Mathematics



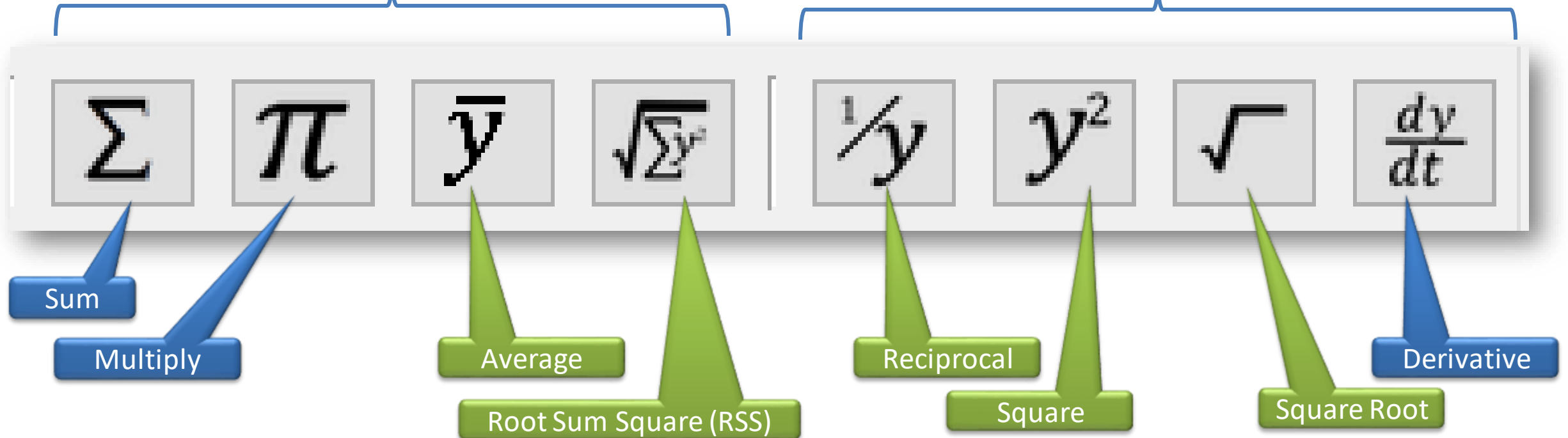
New / Expand
mathematics tools



TFU Math Tools

One Function Generated

One Function Generated for each function selected

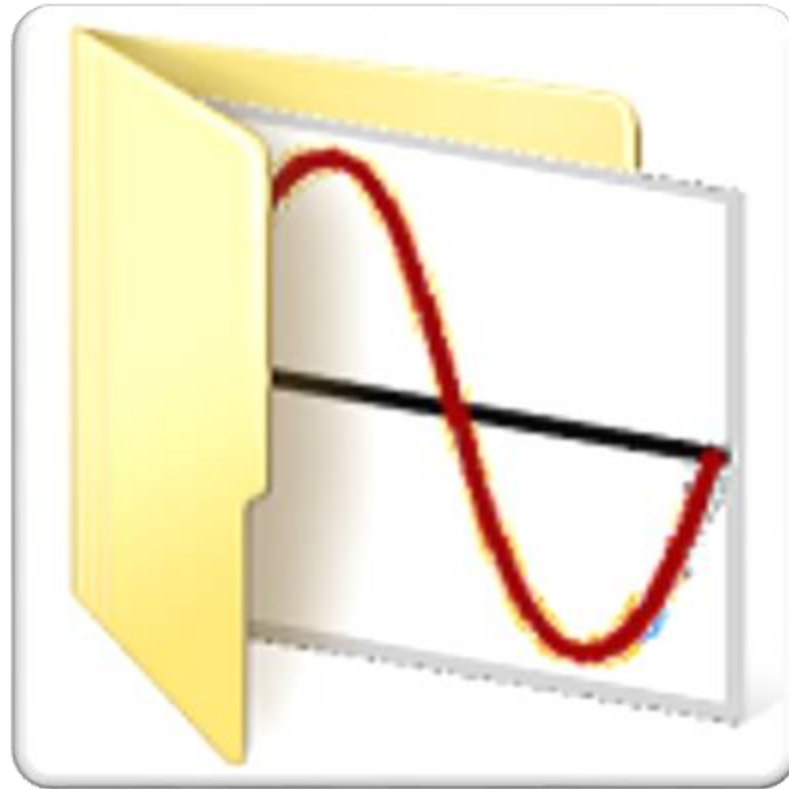


Existing

New

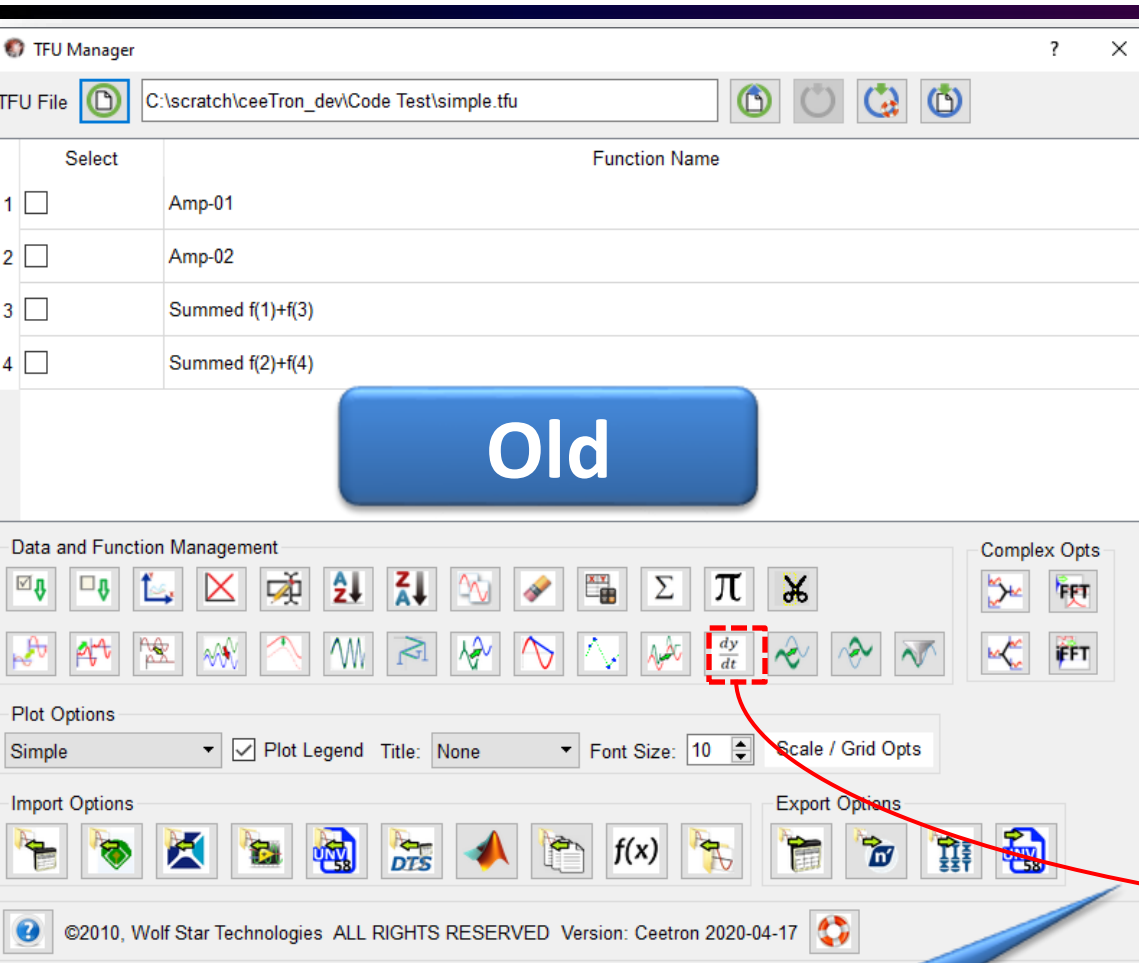
All math functionality is available through Python tfuTools

TFU Mgr GUI Update

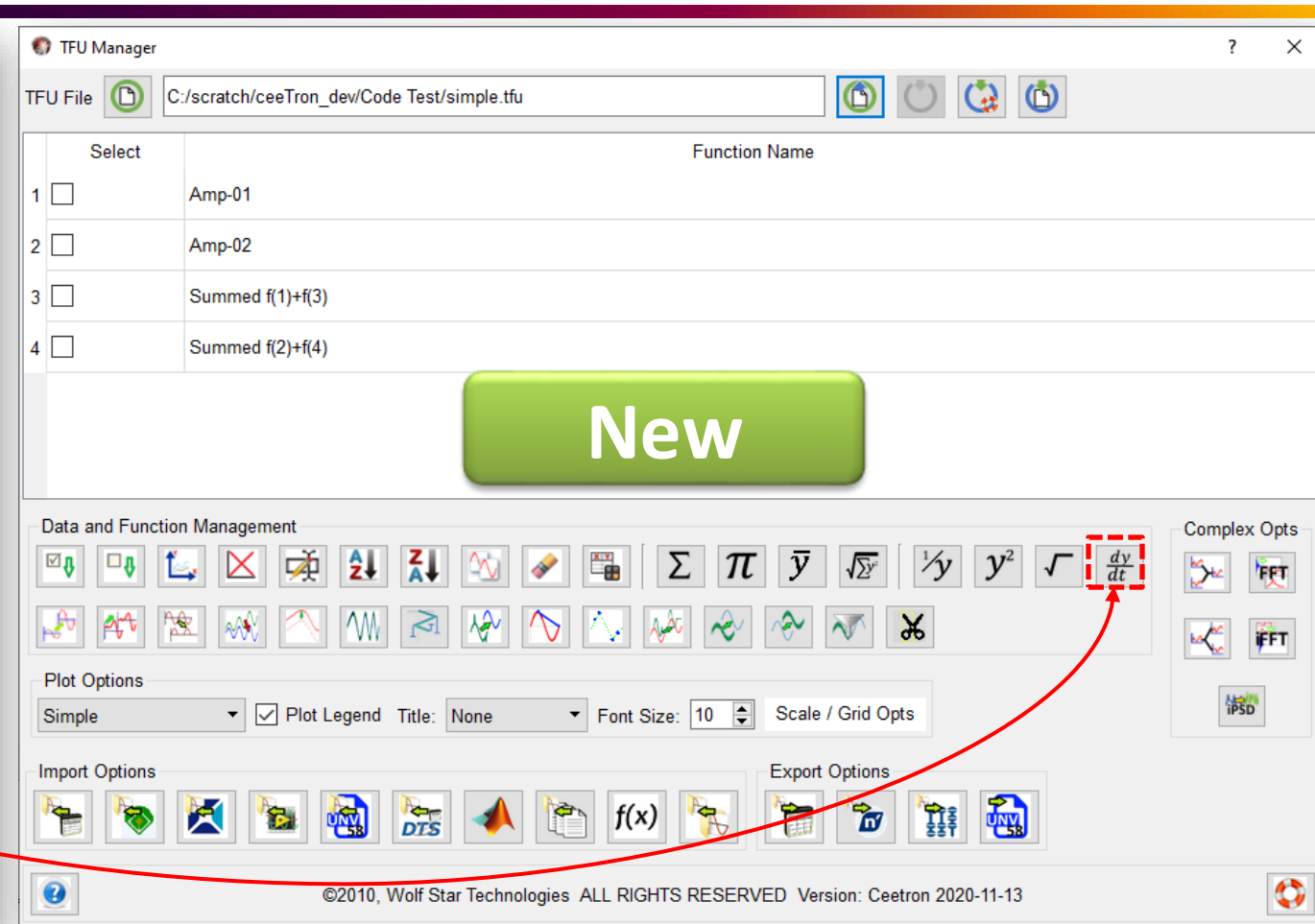




TFU Mgr GUI Update



Old

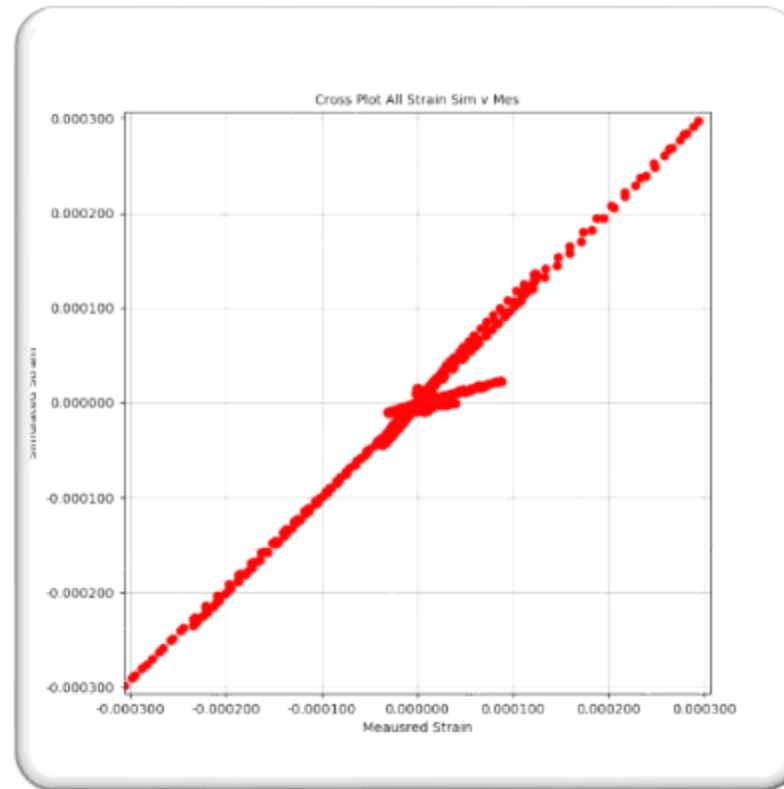


New

Derivative Moved



Cross Plots – Available in tfuTools





CrossPlots in tfuTools

TFU_Scripting_Tools.pdf - Adobe Acrobat Reader DC

File Edit View Sign Window Help

Home Tools Python_Scripting.pdf TFU_Scripting_Tools...

Try Acrobat Pro DC ? Sign In

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Bookmarks

- Scripting
 - 1.1 Importing tfuTools
 - 1.2 Docstring Example
 - 1.3 Data Management Methods
 - 1.4 Data Manipulation Methods
 - 1.4.1 makeiFFT
 - 1.4.2 makeFFT
 - 1.4.3 psdToTime
 - 1.4.4 removeDrift
 - 1.4.5 raceTrackandPV
 - 1.4.6 cleanDict
 - 1.4.7 halfWave
 - 1.4.8 afnorRainflow
 - 1.4.9 tfuSmooth
 - 1.4.10 tfuDiff
 - 1.4.11 crossPlot
 - 1.4.12 sumFuncs
 - 1.4.13 multFuncs
 - 1.4.14 avgFuncs
 - 1.4.15 rssFuncs
 - 1.4.16 reciprocalFuncs
 - 1.4.17 sqrtFuncs
 - 1.4.18 sqrtFuncs
 - 1.4.19 bulkImport
 - 1.5 Methods for Converting to TFU
 - 1.6 Methods for Exporting from TFU

Wolf Star Technologies • TFU SCRIPTING TOOLS

1.4.11 crossPlot

Creates a cross plot given a function, or functions, of interest and a reference function. Optionally calculates regression statistics.

Usage:

```
newDict, newOrder, statsDict = tfuTools.crossPlot(tfuDict, tfuOrder, xFuncName, yFuncNames, statsFlag=True)
```

Required Arguments:

tfuDict: Dictionary of xyData pairs.

tfuOrder: Ordered list of keys, string type function names, in **tfuDict**.

xFuncName: Key (convention is string) containing the name of the reference function, x data, in **tfuDict**.

yFuncNames: List of keys (strings) containing the name of the function(s), y data, of interest in **tfuDict**.

Optional Arguments:

statsFlag: Keyword argument that receives a boolean indicating whether (True) or not (False) to calculate regression statistics. Default is False.

tfuTools
documentation of
crossPlot
functionality

Save Animation





Save animation to MP4

Wolf Star Technologies True-Tools

True-Suite Cloud Draw Style View Tools

Results Mgr

State: State 1 (t=0.148583)

Contour Result: All Displacement

Contour Style: Contour on Deformed

Vector Result: No selection

Filter

Contour: ☒ Vector: ☒

Data Type:

Data Component:

Data Location:

Single Series Options

Tracking TFU

Console Output

New True-Load version available
Download using:
Tools->Update True-Load Software

Opening Main Window
C:/scratch/ceeTron_dev/Code Test/hLamp-SimTest-hLamp-QSE.t3d
0.000 s: Starting currentVisibleElementList...
0.114 s: CurrentVisibleElementList done...
0.000 s: Starting currentVisibleElementList...
0.043 s: CurrentVisibleElementList done...

Save As

File name:

Save as type: AVI Files (*.avi) MP4 Files (*.mp4)

AVI and MP4 (New) are available for output. AVI is default. In the future MP4 will be default.

On Screen Ruler





Ruler Marker Adjustment

Wolf Star Technologies True-Tools

True-Suite Cloud Draw Style View Tools

Results Mgr

State: State 13 (t=0.207234)

Contour Result: No selection

Contour Style: Contour on Deformed

Vector Result: No selection

Filter

☒ Contour ☒ Vector

Data Type:

Data Component:

Data Location:

Single Series Options

Tracking TFU

Console Output

```
0.000 s: Starting currentVisibleElementList...
0.043 s: CurrentVisibleElementList done...

=====
Save Animation
C:\scratch\ceeTron_dev\bitBucketRepo\dev\python\wst\ffmpeg.exe
=====
Save Animation
=====
Measured Distance: 0.68512
Measured Distance: 2.90795
```

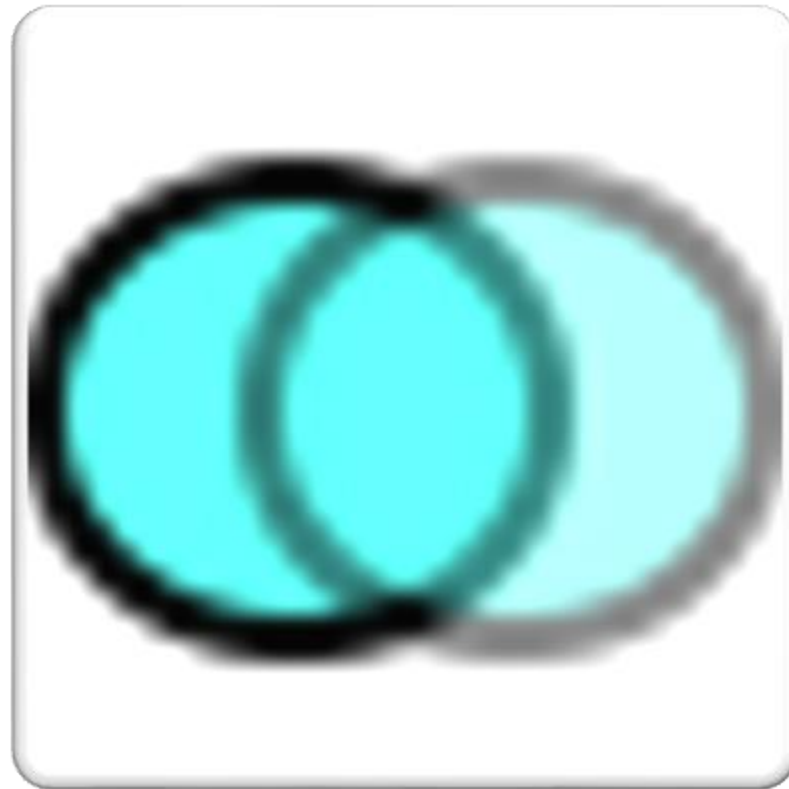
Ruler

Ruler Length: 7.44496
Measurement Dist: 2.90795
Ruler Angle: -30.0°

Ruler marker adjustment follows angle of ruler.

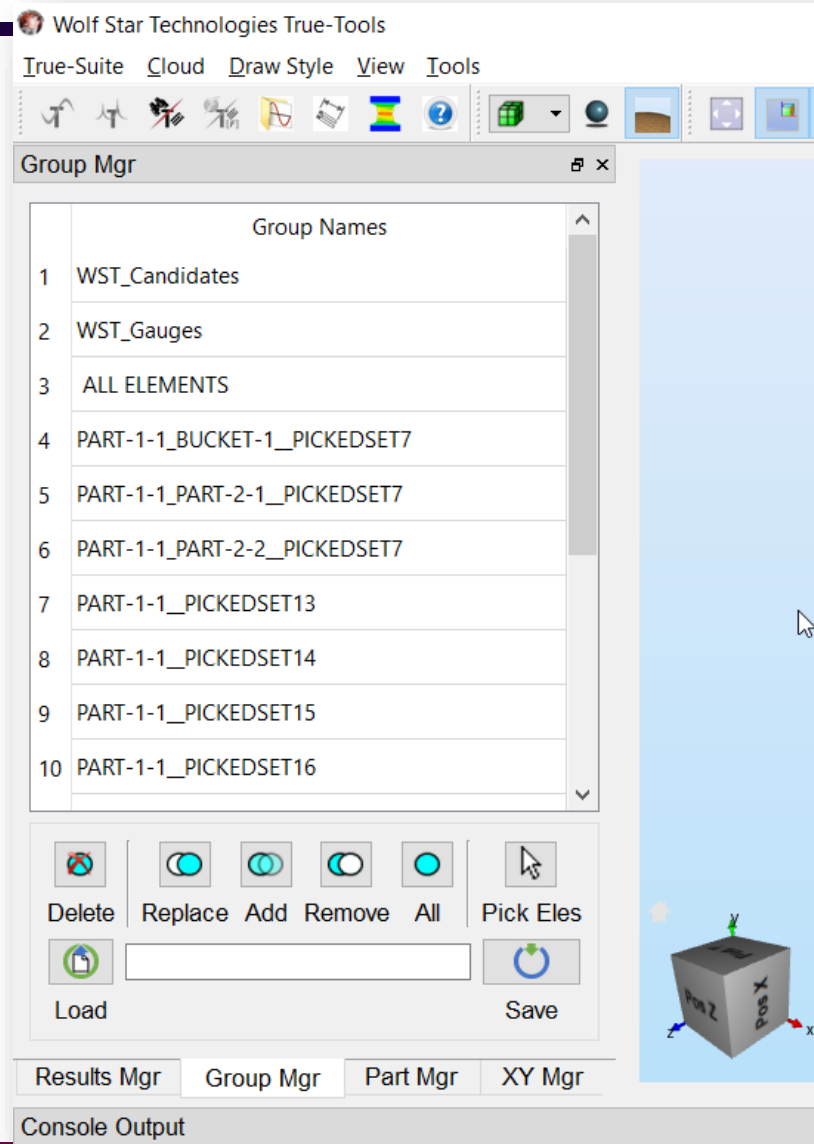
Previously, only horizontal mouse movements effected the ruler marker.
→ This made using the ruler difficult.

Group Sorting

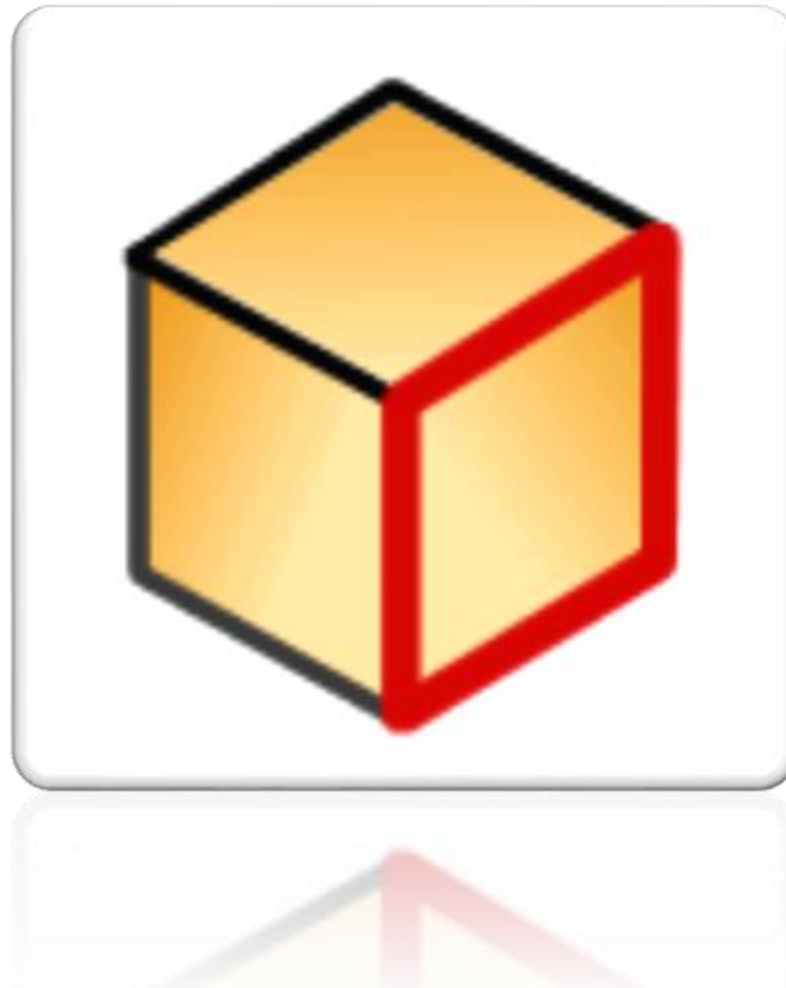




FEA Groups are now sorted alphabetically



Key Plane





Key In Plane: Point, Normal

Wolf Star Technologies True-Tools

True-Suite Cloud Draw Style View Tools

Results Mgr

State: Increment 0: Base

Contour Result: No selection

Contour Style: Contour

Vector Result: No selection

Filter

☒ Contour ☒ Vector

Data Type:

Data Component:

Data Location:

Single Series Options

Pos X

Point, Vector
Element Face
3 Pt Plane
Point, Vector

Plane Offset: 0.0 0.023, +1.368, -0.1, -1

Console Output

```
pt01 = [+0.02380967, +1.36865604, -0.87601697]
pt02 = [+0.02380967, +1.06380820, -1.22838807]
d01 = 0.46593732748321337
midPt01 = [ 0. -0.15242392 -0.17618555]
dx01 = 0.0
dy01 = -0.3048478364944458
dz01 = -0.35237109661102295
```

Console Output Python

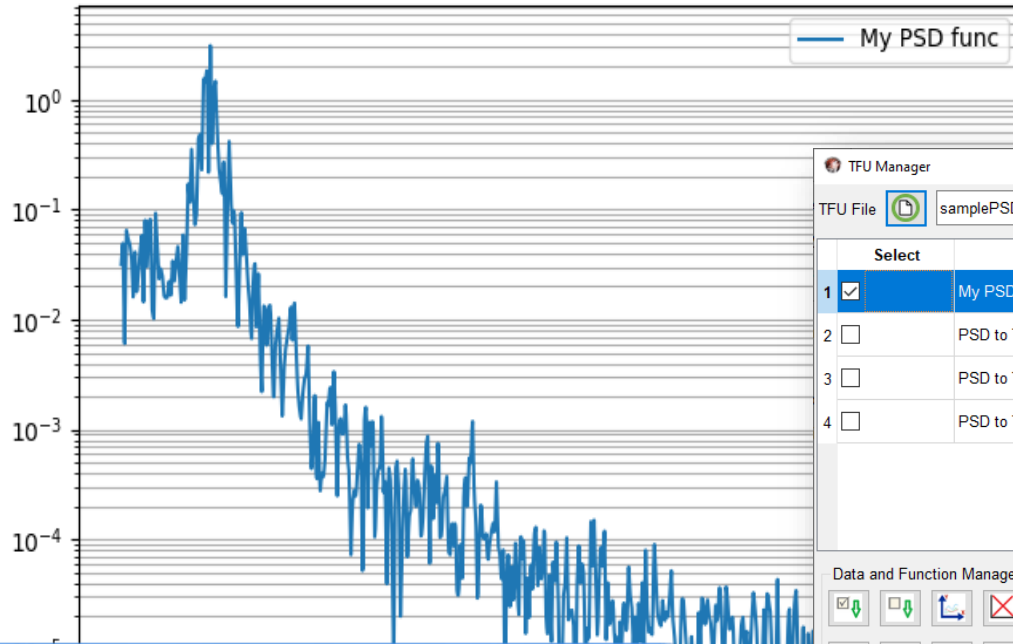
Wolf Star Technologies True-Tools
Filename: headlamp-G-loads.odb
Parts: 5 Elements 954 Nodes 628

PSD to Time






PSD to Time



1. Select PSD
2. Click PSD to Time

Generates random time histories that obey the PSD.

TFU Manager

TFU File  samplePSD.tfu

Select	
1 <input checked="" type="checkbox"/>	My PSD func
2 <input type="checkbox"/>	PSD to Time(My PSD func)
3 <input type="checkbox"/>	PSD to Time(My PSD func)-1
4 <input type="checkbox"/>	PSD to Time(My PSD func)-2

Data and Function Management

Plot Options

Simple ☒ Plot Legend Title: None Font Size: 10 Scale / Grid Opts

Import Options

Export Options

Complex Opts

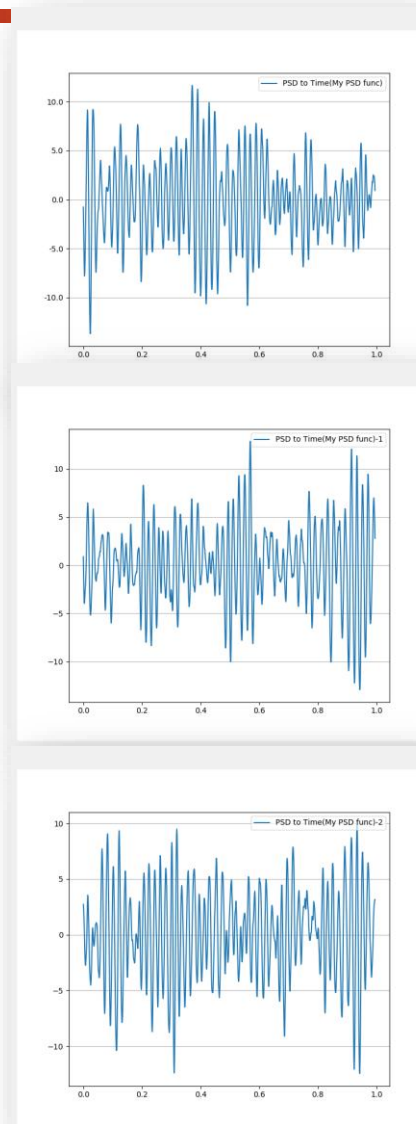
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Complex Opts

FFT

iFFT

iPSD





PSD to Time in tfuTools

TFU_Scripting_Tools.pdf - Adobe Acrobat Reader DC

File Edit View Sign Window Help

Home Tools Python_Scripting.pdf TFU_Scripting_Tools...

Try Acrobat Pro DC

?

Sign In



Bookmarks

scripting

1.1 Importing tfuTools

1.2 Docstring Example

1.3 Data Management Methods

1.4 Data Manipulation Methods

1.4.1 makeiFFT

1.4.2 makeFFT

1.4.3 psdToTime

1.4.4 removeDrift

1.4.5 raceTrackandPV

1.4.6 cleanDict

1.4.7 halfWave

1.4.8 afnorRainflow

1.4.9 tfuSmooth

1.4.10 tfuDiff

1.4.11 crossPlot

1.4.12 sumFuncs

1.4.13 multFuncs

1.4.14 avgFuncs

1.4.15 rssFuncs

1.4.16 reciprocalFuncs

1.4.17 sqrFuncs

1.4.18 sqrtFuncs

1.4.19 bulkImport

1.5 Methods for Converting to TFU

1.6 Methods for Exporting from TFU

1.4.3 psdToTime

Converts data from Power Spectral Density (PSD) domain to the time domain. Only use this method if your data is already in PSD format.

Usage:

```
xyDataTime, timeName = tfuTools.psdToTime(tfuDict, psdName='PSDFunc1')
```

Required Arguments:

tfuDict: dictionary containing XY data in PSD

psdName: string name of/key to the PSD function

Optional Arguments:

psdRepeats: integer number of times time data
Default is 1.

Return Values:

xyDataTime: XY data containing the converted time data.

timeName: string name of the converted time function.

Usage Example:

```
import tfuTools # See Importing tfuTools for details
```

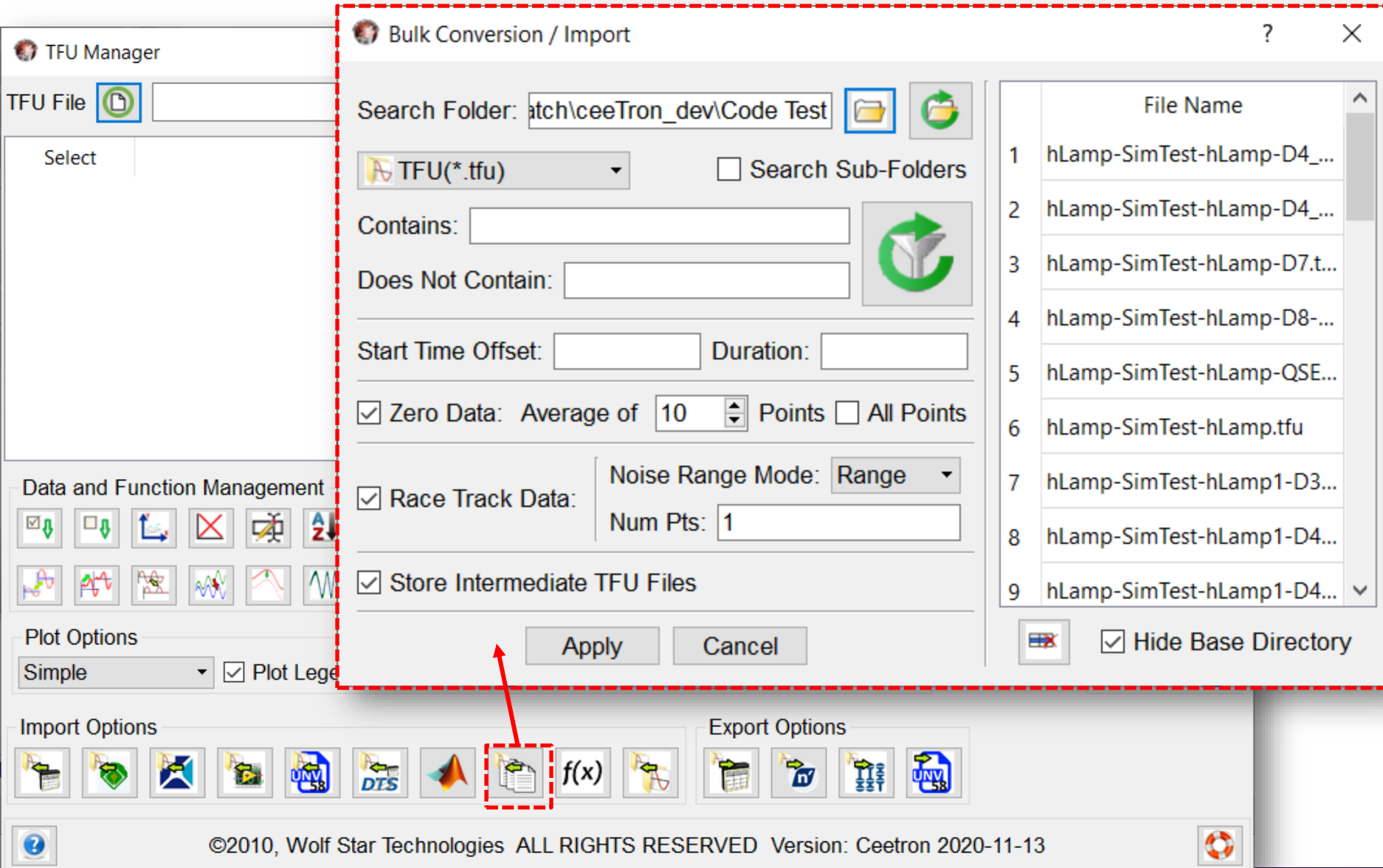
```
import tfuTools # See Importing tfuTools for details
#
# Load existing data; see loadDict
#
tfuDict, tfuOrder = tfuTools.loadDict('psdFileName.tfu')
#
# Convert from PSD to Time
#
xyDataTime, timeName = tfuTools.psdToTime(tfuDict, psdName='myPSDFunc')
#
# Save new function; see dump
#
tfuDict[timeName] = xyDataTime
tfuTools.dump(tfuDict, 'psdFileName.tfu')
```

Bulk Import TFU files





Bulk Import TFU Files



Seems counter-intuitive at first to “Bulk Import” TFU files.

However, this is a clever usage of Bulk Import to allow you to Zero and Race Track existing TFU files quickly.

UNV 58 Reader

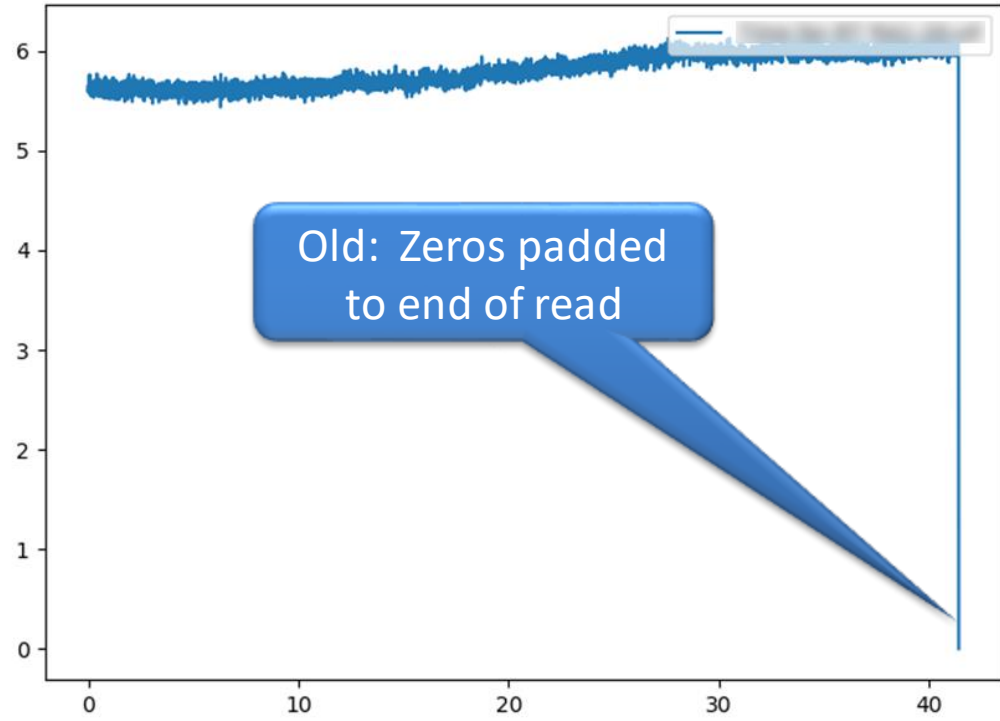




UNV Reader Improvements

Improvements:

- Eliminate trailing zeros in read
- Allow for even / uneven data spacing
- Allow for multiple signals with same name.



Old: Zeros padded
to end of read



New: Data read properly



UNV Reader Improvements

TFU Manager

TFU File

Select	Function Name
<input type="checkbox"/>	Time for RT RA3TC-01-degC
<input type="checkbox"/>	Time for RT RA3TC-02-degC
<input type="checkbox"/>	Time for RT RA3TC-03-degC
<input type="checkbox"/>	Time for RT RA3TC-04-degC
<input type="checkbox"/>	Time for LT RA1TC-01-degC
<input type="checkbox"/>	Time for LT RA1TC-02-degC
<input type="checkbox"/>	Time for LT RA1TC-03-degC
<input type="checkbox"/>	Time for LT RA1TC-04-degC
<input type="checkbox"/>	Time for LT RA2TC-01-degC
<input type="checkbox"/>	Time for LT RA2TC-02-degC
<input type="checkbox"/>	Time for LT RA2TC-03-degC
<input type="checkbox"/>	Time for LT RA2TC-04-degC
<input type="checkbox"/>	Time for LT RA3TC-01-degC
<input type="checkbox"/>	Time for LT RA3TC-02-degC
<input type="checkbox"/>	Time for LT RA3TC-03-degC
<input type="checkbox"/>	Time for LT RA3TC-04-degC

Data and Function Management

Plot Options

Simple ☒ Plot Legend Title: None Font Size: 10 Scale / G

Import Options

Export Options

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TFU Manager

TFU File

Select	Function Name
<input type="checkbox"/>	Time for RT RA3TC-01-degC(1)
<input type="checkbox"/>	Time for RT RA3TC-02-degC(1)
<input type="checkbox"/>	Time for RT RA3TC-03-degC(1)
<input type="checkbox"/>	Time for RT RA3TC-04-degC(1)
<input type="checkbox"/>	Time for LT RA1TC-01-degC(1)
<input type="checkbox"/>	Time for LT RA1TC-02-degC(1)
<input type="checkbox"/>	Time for LT RA2TC-01-degC(1)
<input type="checkbox"/>	Time for LT RA2TC-02-degC(1)
<input type="checkbox"/>	Time for LT RA2TC-03-degC(1)
<input type="checkbox"/>	Time for LT RA2TC-04-degC(1)
<input type="checkbox"/>	Time for LT RA3TC-01-degC(1)
<input type="checkbox"/>	Time for LT RA3TC-02-degC(1)
<input type="checkbox"/>	Time for LT RA3TC-03-degC(1)
<input type="checkbox"/>	Time for LT RA3TC-04-degC(1)

Data and Function Management

Plot Options

Simple ☒ Plot Legend Title: None Font Size: 10 Scale / Grid Opts

Import Options

Export Options

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Duplicate Function names from UNV file are read.

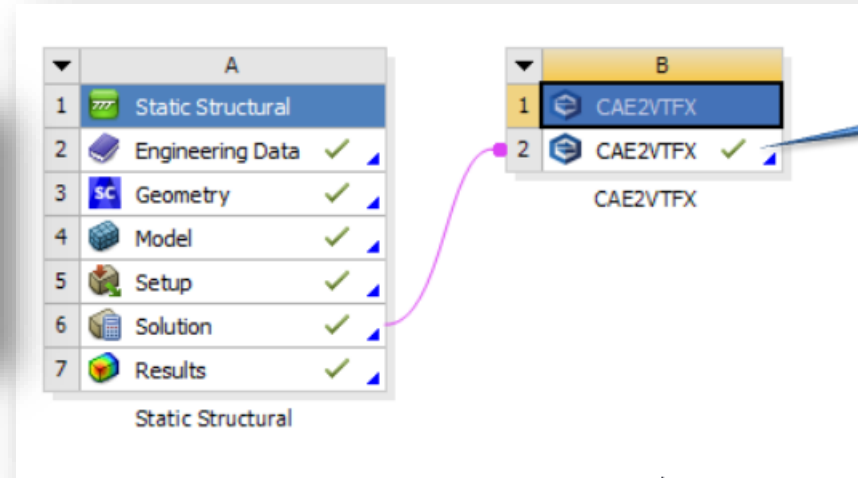
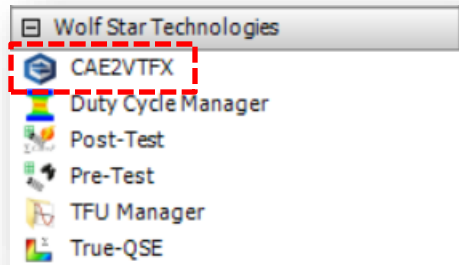
Previously, duplicate function names would overwrite functions with the same name.

Ansys WorkBench Updates





Ansys WorkBench Updates



Generates VTFx file

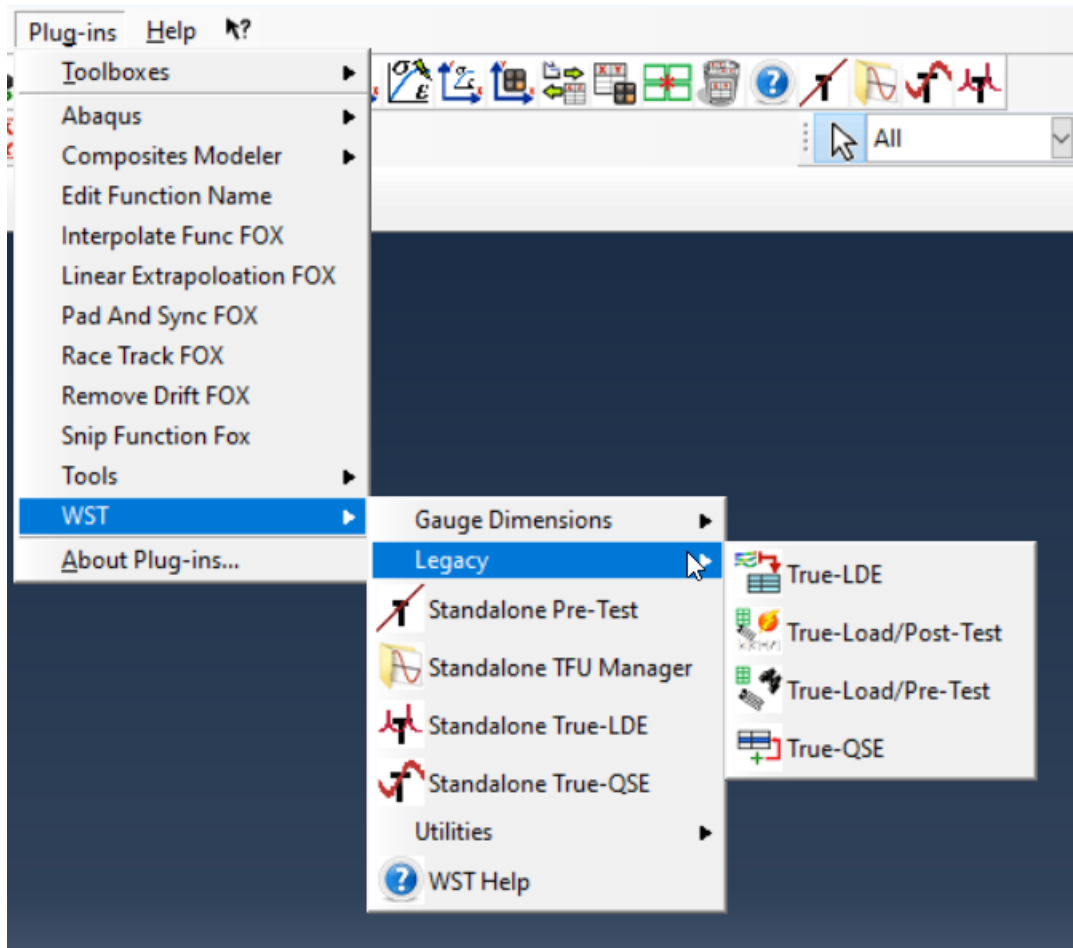
Workbench plugins have been updated to eliminate issues with 2020 R2 environment variables

Abaqus Plug-in Updates





Abaqus Plug-in Updates



The Abaqus Plug-ins menu has been updated with the Standalone True-Load tools on top.

The Legacy True-Load tools are still available, but they are no longer supported.



Launching Standalone from Abaqus/CAE

The screenshot shows the Abaqus/CAE interface with the 'Gauge Dimensions' menu open. The 'Standalone True-Test' option is highlighted. A red arrow points from this option to the 'True-Load/Pre-Test' dialog box. The dialog box displays the following information:

TLD File: C:/scratch/headlamp/headlamp-G-loads.tld
FEA DB: C:/scratch/headlamp/headlamp-G-loads.odb
Load Shells Only: ☒
Open as VTfx: ☒

Select elements for candidate gauges: ☐ None

Stationary Loads: ☒ Moving Loads: ☐

Step	Frame	Scale Factor
1 Load Case: GRAV-10GX	2	1.0
2 Load Case: GRAV-10GY	3	1.0
3 Load Case: GRAV-10GZ	4	1.0

Scale Options: ☒ Auto E-Scale
☒ Plot Legend
Font Size: 10
Pre-Test Report: ☐

Increment: 0: Base St Scale: 1.0
Shell Surface: ☒ Top SPOS ☐ Bottom SNEG

Gauge Placement: Number of Gauges: 3
☒ Refresh Strain Tensors

Test Simulation: Event File Name:

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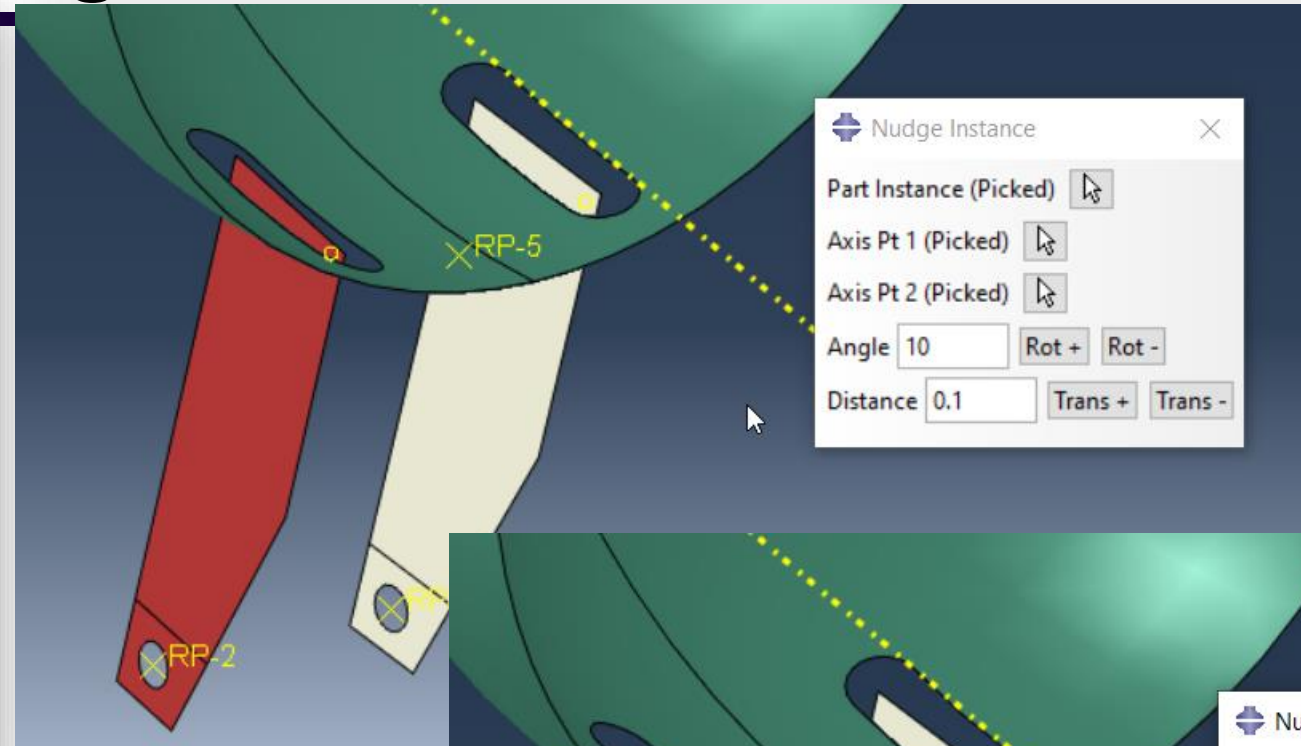
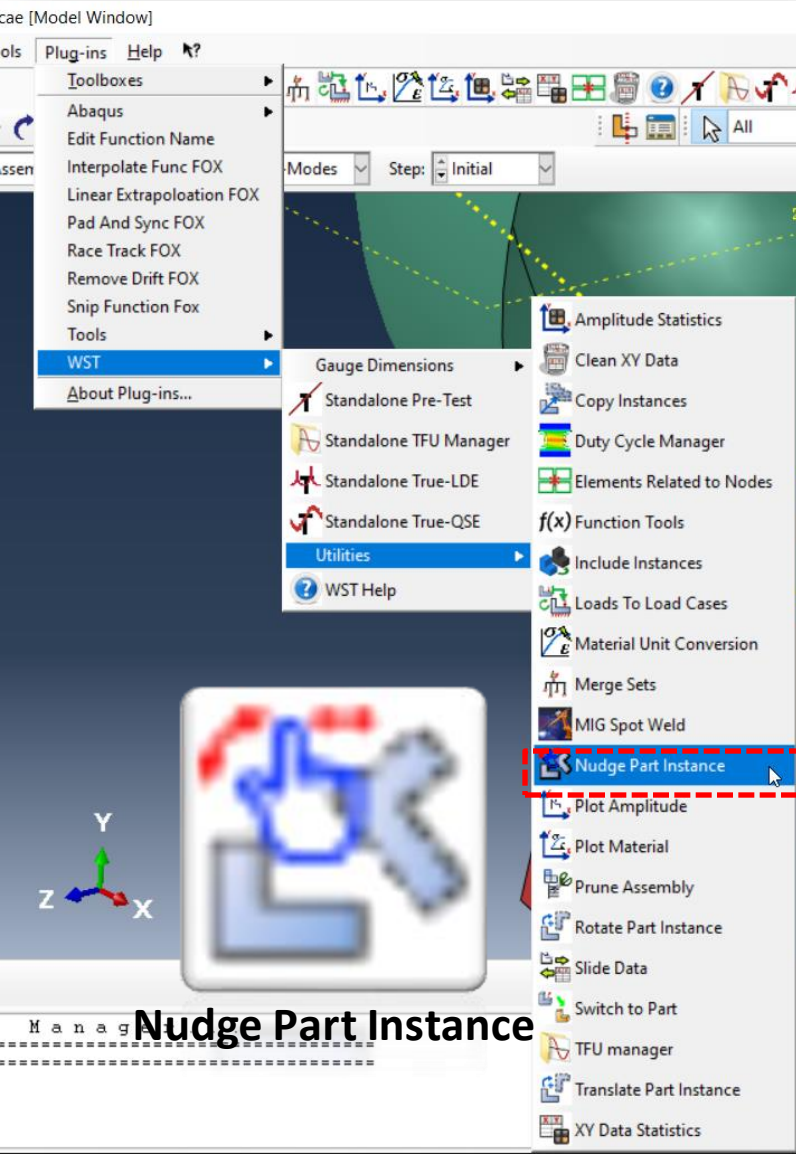
Console Output:

```
Nodes: 628
Elements: 554
=====
Adding all steps...
=====
Load Case: GRAV-10GX 2 1.0
Load Case: GRAV-10GY 3 1.0
Load Case: GRAV-10GZ 4 1.0
=====
```

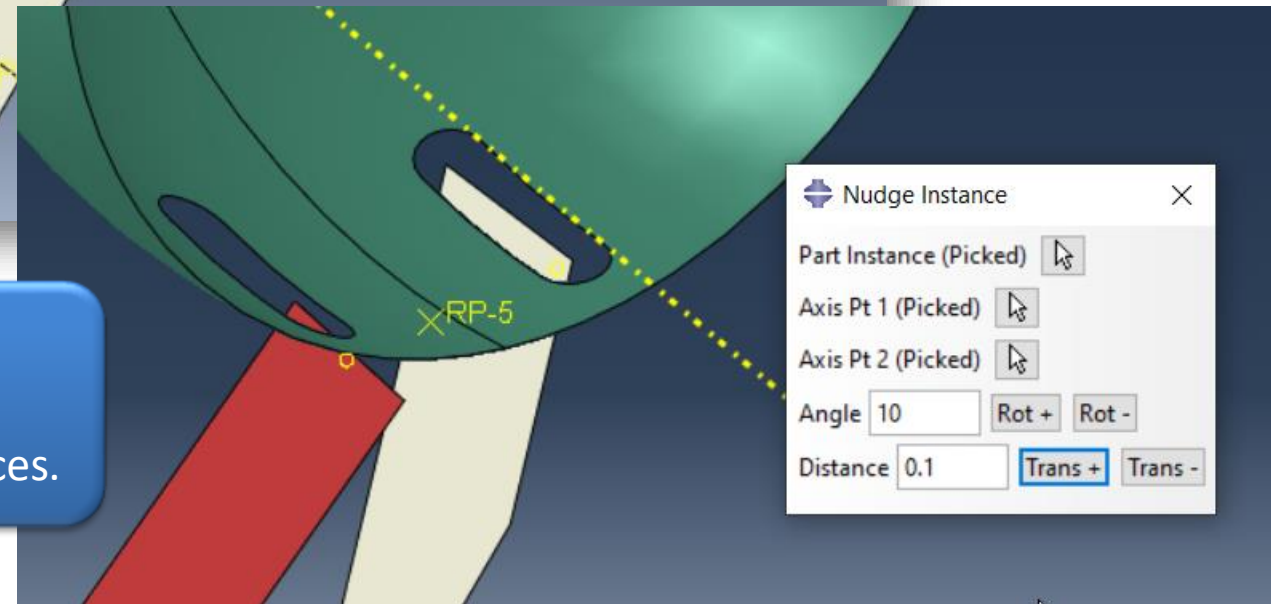
Launching True-Load/Pre-Test and True-QSE from Abaqus CAE creates a TLD or QSE file with the same name as the ODB file.



New Abaqus Utility Plug-in Nudge Part Instance



Useful for fine
adjustment of
position of instances.

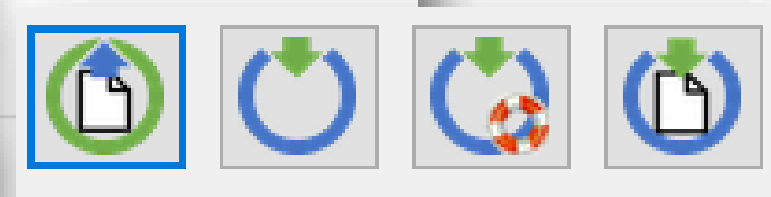
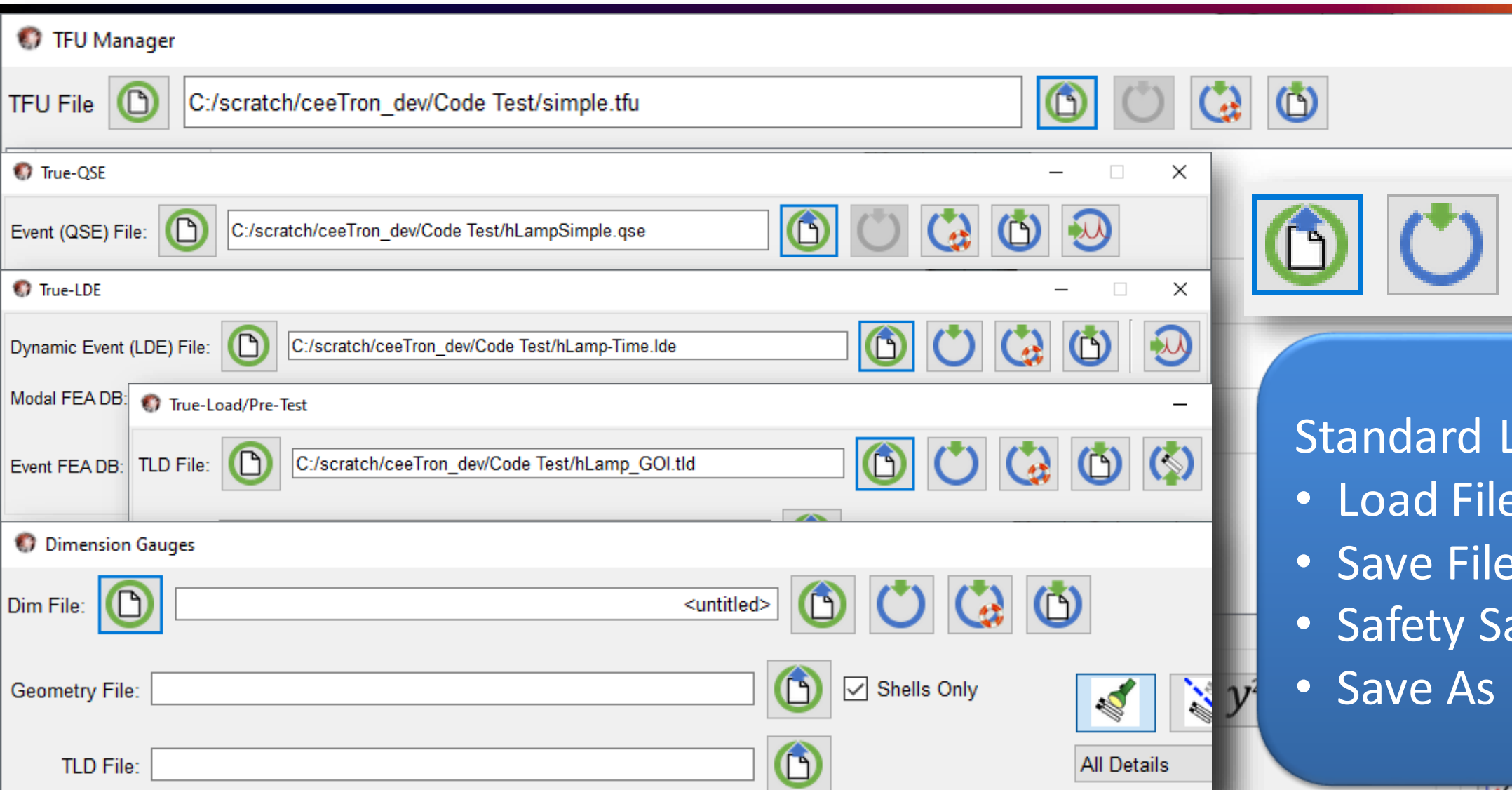


Safety Save





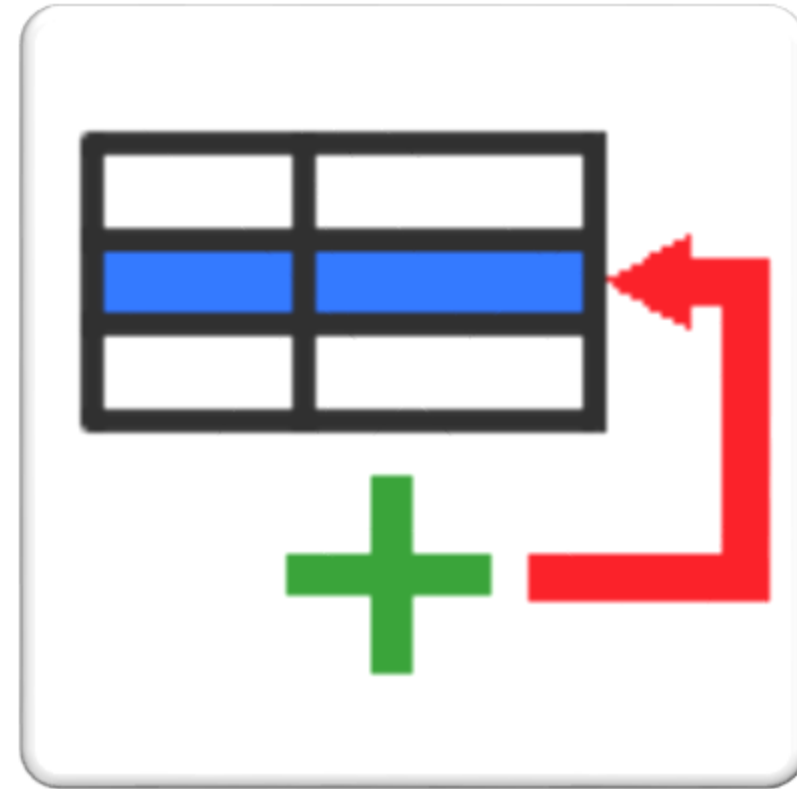
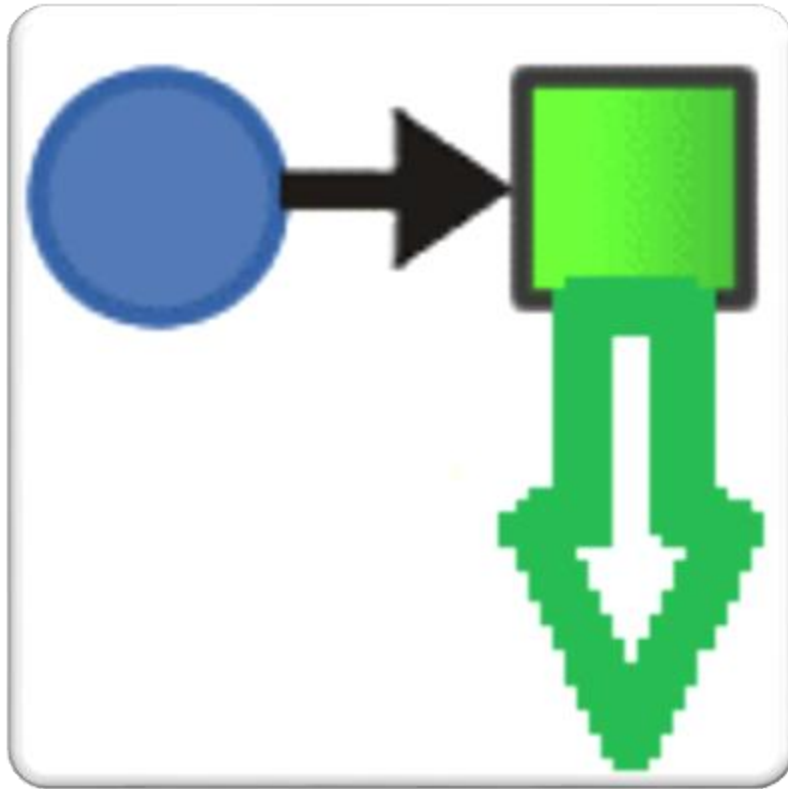
Standardize Safety Save Layout



Standard Layout:

- Load File
- Save File
- Safety Save File
- Save As

Add Load Checks














Add Load Checks

Stationary Loads Moving Loads

	Step	Frame	Scale Factor
1	Load Case: GRAV-10GX	2	1.0
2	Load Case: GRAV-10GY	3	2.8854694240984777
3	Load Case: GRAV-10GZ	4	1.2852718594052128

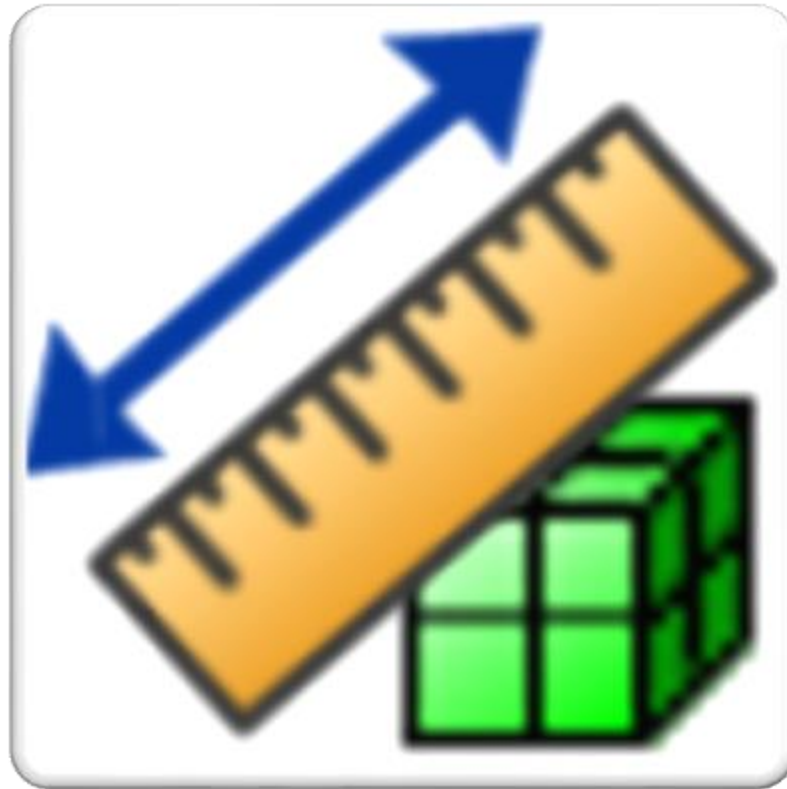
Load Case: GRAV-10GZ Scale: 1.0    ☐ Enable Table Sort

Shell Surface: ☒ Top SPOS ☐ Bottom SNEG

Scale Options
Choose Scales 
☒ Auto E-Scale
  
☒ Plot Legend
Font Size: 10 
Pre-Test Report: 

Loading States to the load table checks to make sure the State is not already in the load table.

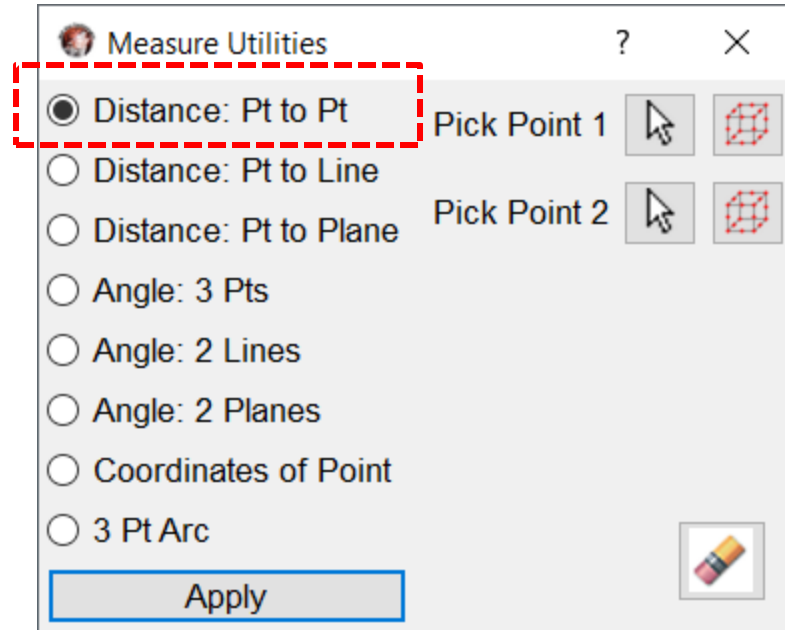
Measure Utils



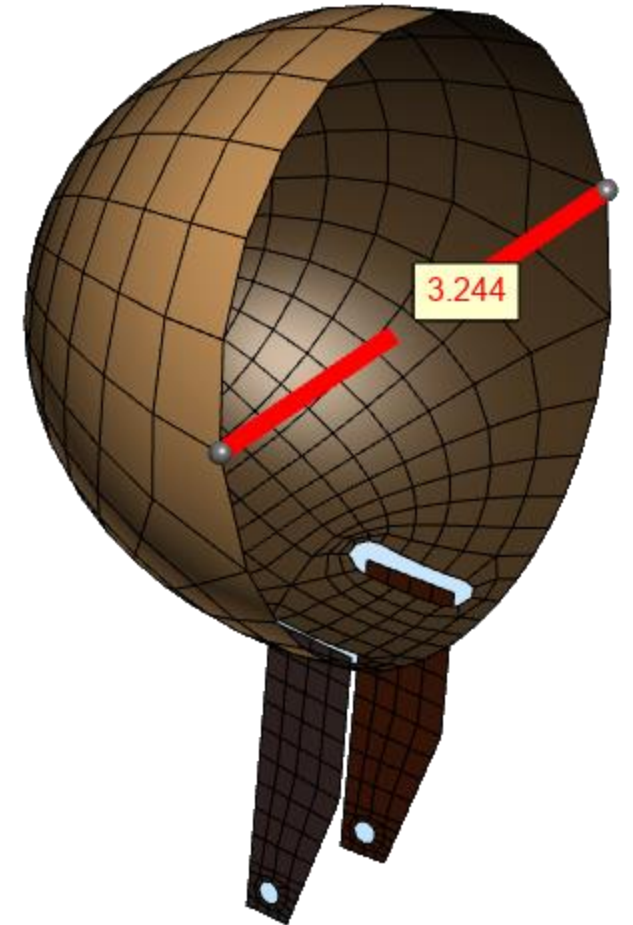
Measure Utils

New Features:

- Mid Pt
- Coordinates of Point
- 3 Pt Arc



```
-----
pt01 = [+0.02380967, +0.05605028, +1.62403309]
pt02 = [+0.02380967, +0.14896713, -1.61815751]
d01 = 3.24352176254778
midPt01 = [0.02380967 0.10250871 0.00293779]
dx01 = 0.0
dy01 = 0.09291685000061989
dz01 = -3.2421905994415283
-----
```

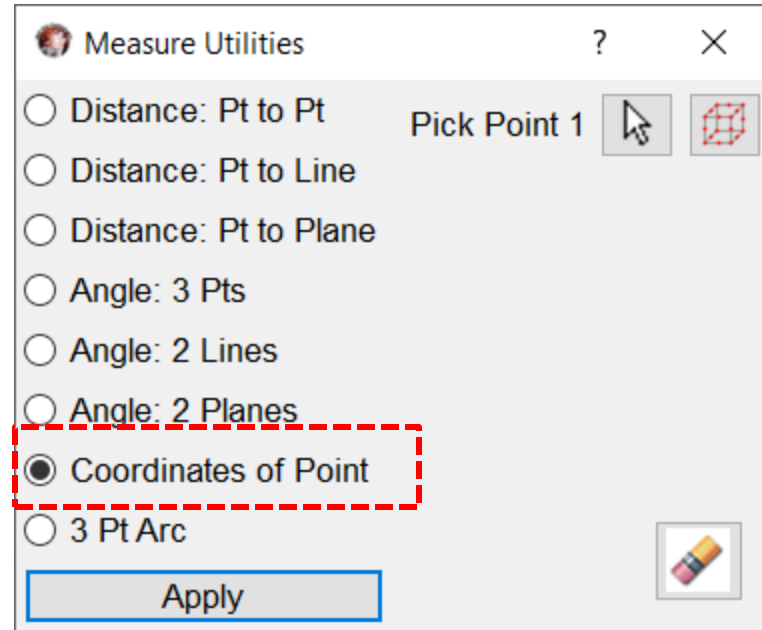




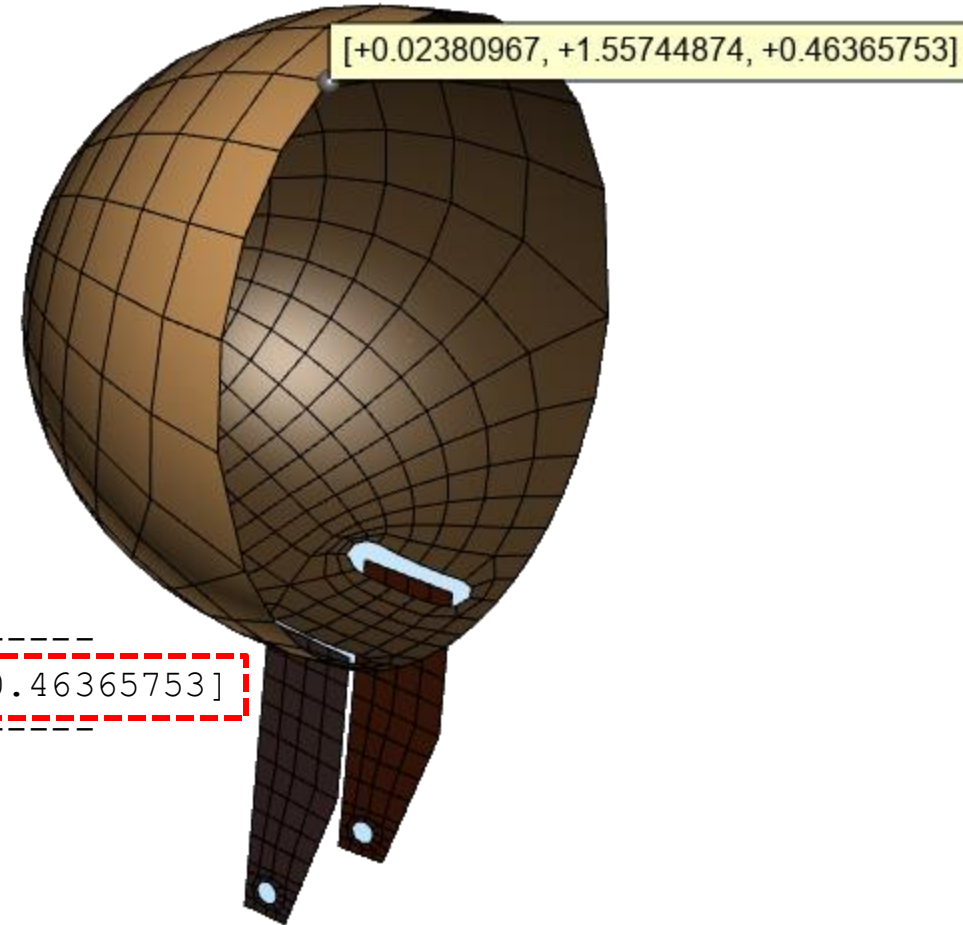
Measure Utils

New Features:

- Mid Pt
- Coordinates of Point
- 3 Pt Arc



pt03 = [+0.02380967, +1.55744874, +0.46365753]

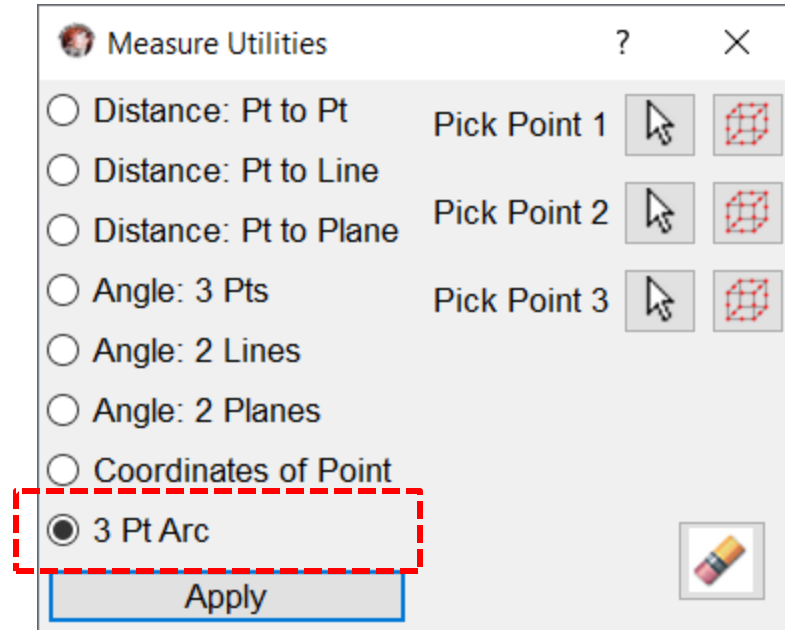




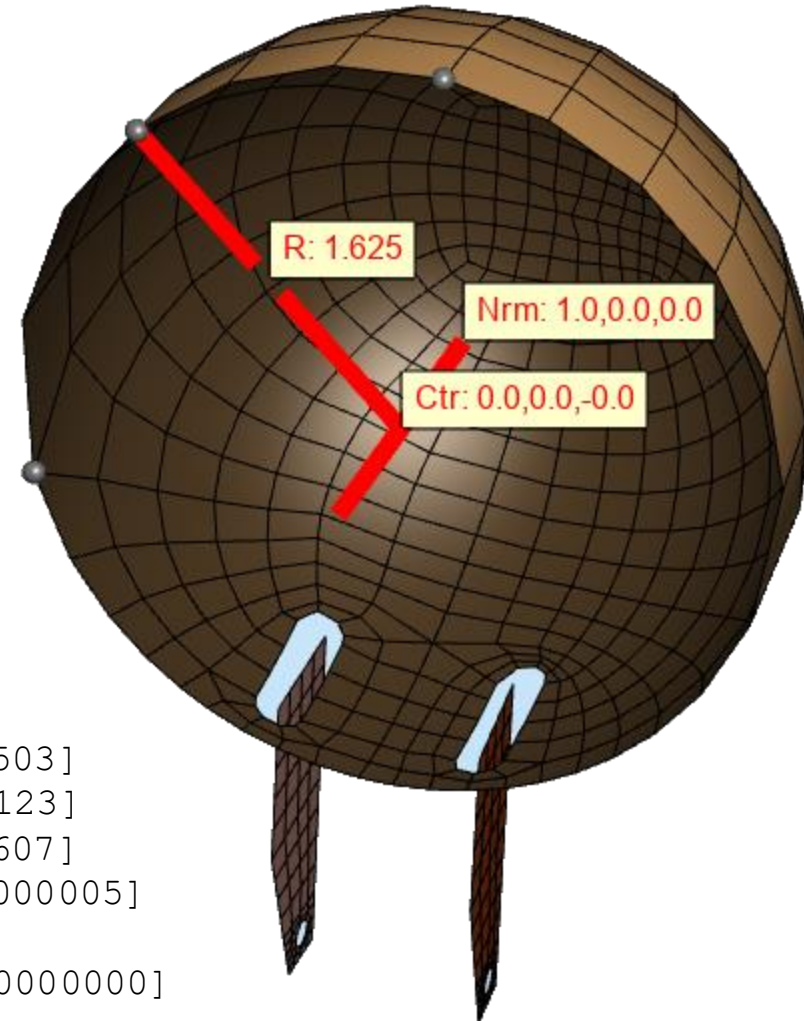
Measure Utils

New Features:

- Mid Pt
- Coordinates of Point
- 3 Pt Arc



```
-----  
pt04 = [+0.02380967, +1.62499952, -0.00130503]  
pt05 = [+0.02380967, +1.04113710, +1.24766123]  
pt06 = [+0.02380967, -0.61970305, +1.50219607]  
ctrPt03 = [+0.02380967, +0.00000002, -0.00000005]  
rad03 = 1.6250000264754414  
nrmVec03 = [+1.00000000, +0.00000000, +0.00000000]  
-----
```



True-LDE



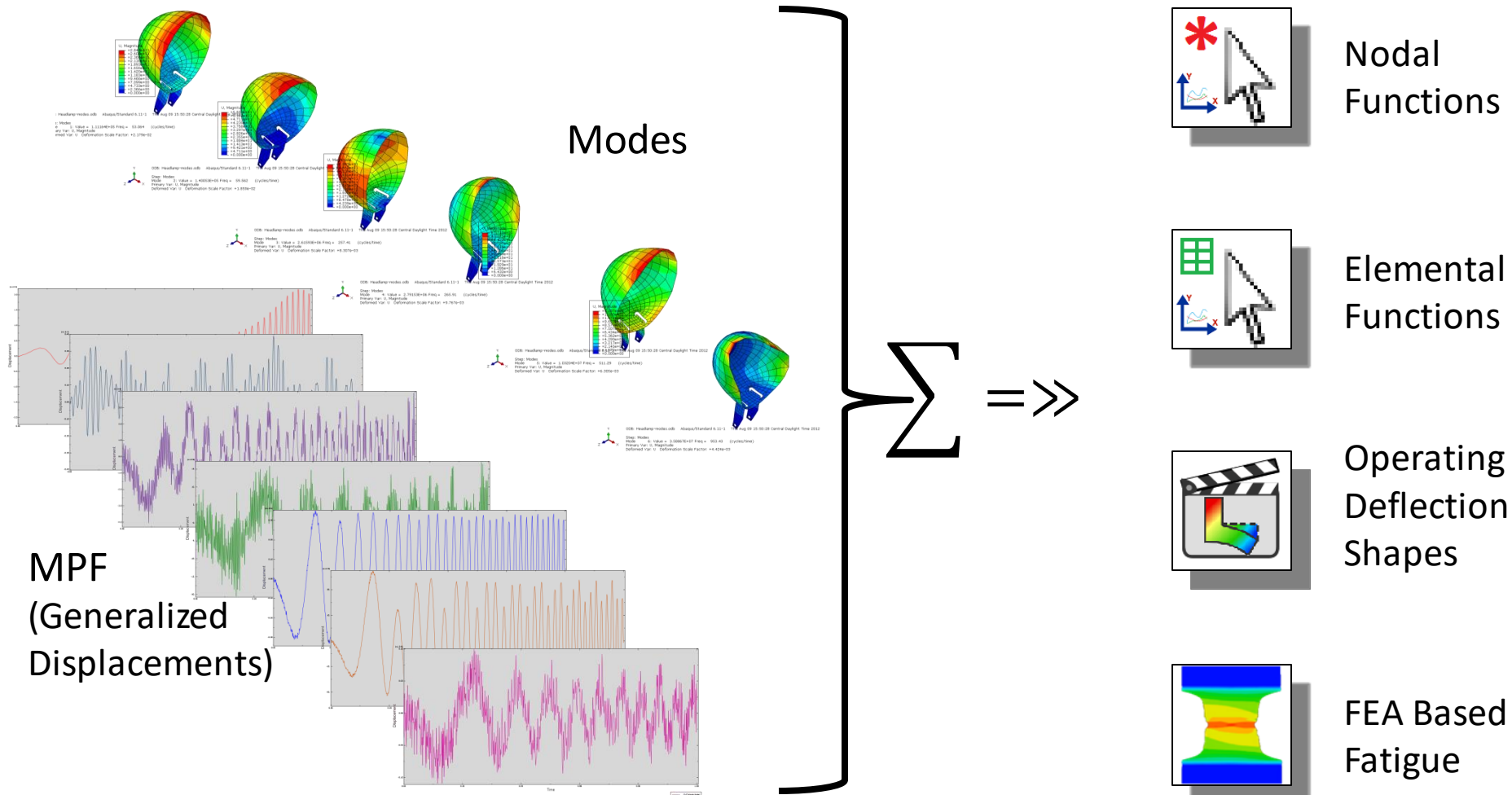


True-LDE Motivation

Traditional FEA

- ✗ Large storage requirements for field data
- ✗ Some FEA need to know nodes & elements for generating xyData output requests apriori
- ✗ Solution times can be slow (due to storage)
- ✗ New XY plots require resubmitting the deck
- ✗ Modal mass participation not obvious
- ✗ Pre-Load not considered in results transient results
- ✗ Not intuitive
- ✗ Batch mode oriented

True-LDE – Basic Concept





True-LDE – Important Features

- Include Pre-Load
- No field results stored in the event step
 - Only MPFs
- Supports
 - Time Domain
 - Frequency Domain (deterministic)
 - PSD Domain (random)
- Interface to durability software
 - All in time domain
 - Ready-to-run
- Convert between Time, Frequency and PSD domains
- Familiar behavior – Results generation similar to True-QSE



A Recent Benchmark

	Original File	Prep for True-LDE™	
	freq_time_orig.inp	freq_time_LDE.inp	
Start Time	11:18:19 AM	12:05:35 PM	
End Time	11:32:26 AM	12:06:12 PM	
Elapsed Time	14.12 min	0.62 min	95.63% Faster
ODB Size	13,010,626,864 bytes	35,081,624 bytes	99.73% Smaller

When solving a linear dynamic response for use with True-LDE, FEA solution time is significantly faster because of the greatly reduced output in the response solution.



The True-LDE Interface

Wolf Star Technologies True-Tools

True-Suite Cloud Draw Style View Tools

Results Mgr

State: Increment 0: Base State

Contour Result: No selection

Contour Style: Contour

Vector Result: No selection

Filter

☒ Contour ☒ Vector

Data Type

Data Component

Data Location

Single Series Options

Results Mgr Group Mgr Part Mgr XY Mgr

Console Output

```
Mode 5: Value = 1.03196E+07 Freq = 511.27 (cycles/time) 6
Mode 6: Value = 3.58862E+07 Freq = 953.42 (cycles/time) 7
Mode 7: Value = 5.87782E+07 Freq = 1220.2 (cycles/time) 8
Mode 8: Value = 8.82566E+07 Freq = 1495.2 (cycles/time) 9
Mode 9: Value = 1.84527E+08 Freq = 2162.0 (cycles/time) 10
Mode 10: Value = 2.29173E+08 Freq = 2409.4 (cycles/time) 11
-----
Modal Model Extraction
-----
Modal Model Up to Date
-----
```

True-LDE

Dynamic Event (LDE) File: C:\scratch\ceeTron_dev\Code Test\hLamp-Time.lde

Modal FEA DB: C:\scratch\ceeTron_dev\Code Test\headlamp-time.odt

Event FEA DB: C:\scratch\ceeTron_dev\Code Test\headlamp-time.odt

☐ Shells Only

☒ Open as VTFx

Hide Table

Event Definition

Active	Freq (hz)	%X Mass	%Y Mass	%Z Mass	%RX Mass	%RY Mass	%RZ Mass	MPF Range	MPF Name
1 <input checked="" type="checkbox"/>	53.066	0.01%	0.00%	95.64%	0.58%	0.21%	0.00%	0.005	GU-001
2 <input checked="" type="checkbox"/>	59.563	76.45%	17.29%	0.01%	0.00%	0.00%	1.33%	0.001	GU-002
3 <input checked="" type="checkbox"/>	257.415	0.38%	1.24%	2.64%	0.01%	94.34%	0.00%	0.000	GU-003
4 <input type="checkbox"/>	265.897	19.94%	64.20%	0.03%	0.02%	1.78%	0.00%	0.000	GU-004

Number of Active Modes: 3

Filter Modes:

Results Generation

☐ Include Pre-Load

Pre-Load State: Increment 0: E

Plot Options

Font Size: 10

☒ Plot Legend

Simple

☒ Y Lin ☐ Y Log

☒ X Lin ☐ X Log

Help Options

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True-LDE is
available to
everyone
through
2021-06-01

Give it a try!

Check out www.wolfstartech.com members area
for True-LDE tutorials and examples