Deep**Lines**

Batch Mode

Post-processing

Example

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IFP Energies nouvelles

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1 INTRODUCTION

This document presents an example of the tool which can easily generate batch processing files from a large amount of data. The tool allows either to fill directly a table in Deeplines or to copy/paste an Excel table.
This document also shows how to export the results in txt files or in a sqlite database, using the batch file created with the tool presented in this document, or using the pre-defined results to generate a batch file.

The example presented here is a FPSO with several **risers.** The model is shown below.

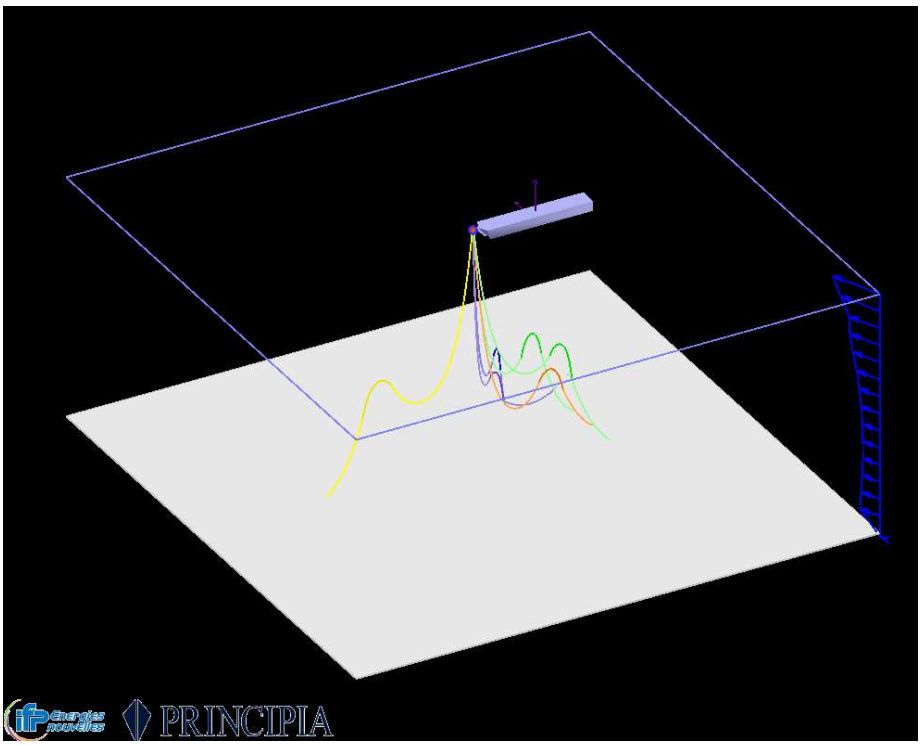


Figure 1-1 : DLW Example used to present the export time series feature

2 USING THE EXPORT RESULTS TOOL

2.1 BUILDING THE TABLE IN THE EXPORT RESULTS TOOL

The “Export results” feature is available in “Tools”. It should be open in the dsk where the analyses have been prepared.

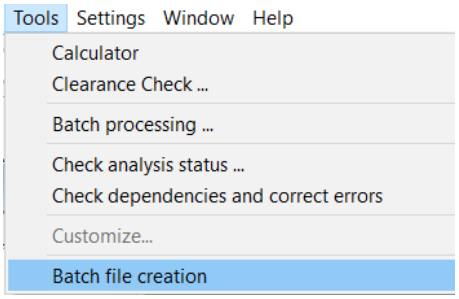
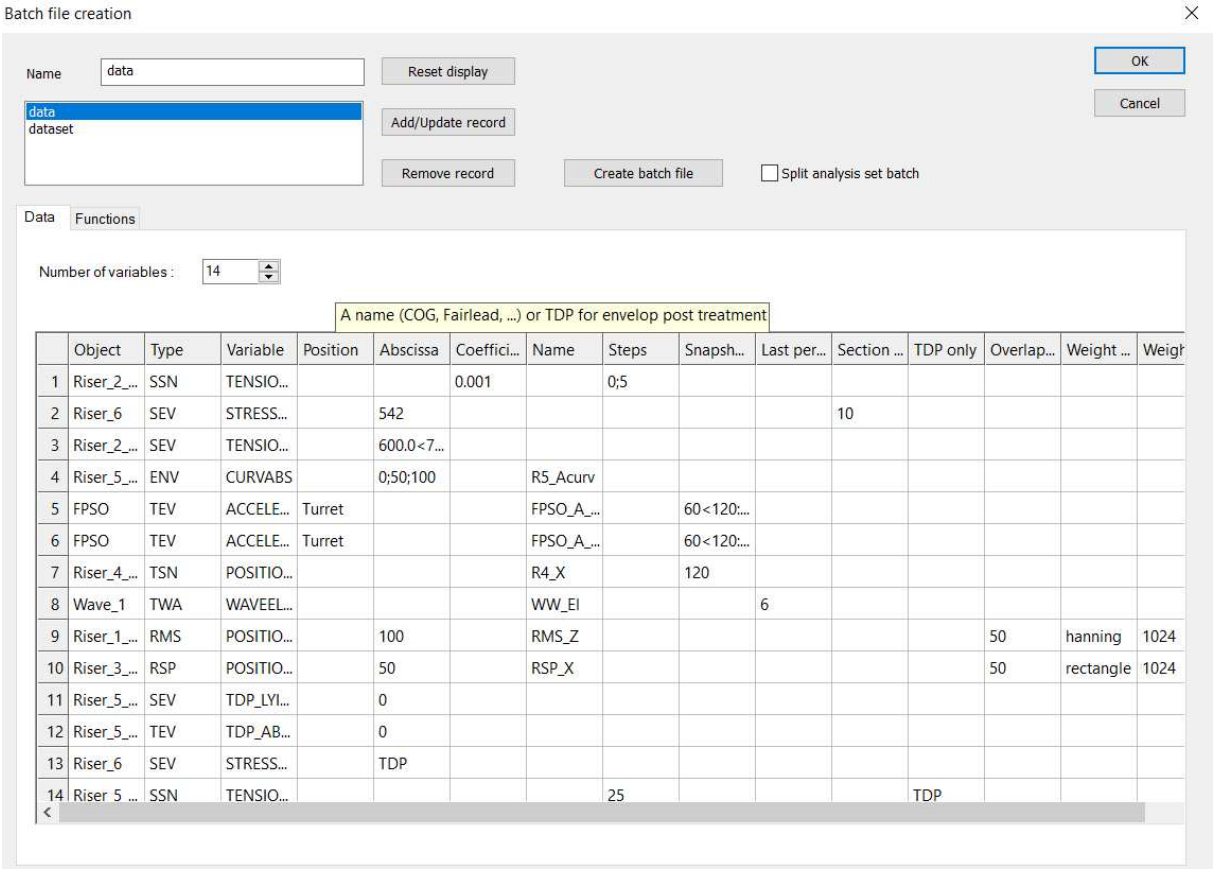


Figure 2-1 : Selection of the “Export results” feature

A new table is added by specifying the name and then clicking on add/update record. The display can also be reset and record can be removed.
Then a table with all parameters for output can be filled with all relevant data. This table can have been prepared in Excel beforehand and be copied and pasted. Only complete tables can be pasted. It is not possible to copy a single line.



	Object	Type	Variable	Position	Abscissa	Coeffici...	Name	Steps	Snapsh...	Last per...	Section ...	TDP only	Overlap...	Weight ...	Weigh
1	Riser_2_...	SSN	TENSIO...			0.001		0;5							
2	Riser_6	SEV	STRESS...		542						10				
3	Riser_2_...	SEV	TENSIO...		600.0<7...										
4	Riser_5_...	ENV	CURVABS		0;50;100		R5_Acurv								
5	FPSO	TEV	ACCELE...	Turret			FPSO_A_...		60<120:...						
6	FPSO	TEV	ACCELE...	Turret			FPSO_A_...		60<120:...						
7	Riser_4_...	TSN	POSITIO...				R4_X		120						
8	Wave_1	TWA	WAVEEL...				WW_EI			6					
9	Riser_1_...	RMS	POSITIO...		100		RMS_Z						50	hanning	1024
10	Riser_3_...	RSP	POSITIO...		50		RSP_X						50	rectangle	1024
11	Riser_5_...	SEV	TDP_LYI...		0										
12	Riser_5_...	TEV	TDP_AB...		0										
13	Riser_6	SEV	STRESS...		TDP										
14	Riser_5_...	SSN	TENSIO...					25				TDP			

Figure 2-2 : Table specifying which data will be output

Several columns should be filled, see **"User interface/Results Processing/General Post-Processing/Export time series"** in help.
Some columns are mandatory and some are optional, see Figure 2-5.

2.2 GENERATING AND LAUNCHING BATCH FILES GENERATED BY THE EXPORT RESULTS TOOL

Once table filled the button "create batch files" allow creating **one batch file per analysis or analysis set** in the same folder as the .dsk file. Error messages can appear at this stage if data are not filled correctly.
Once the batch file has been created, your record will be automatically saved and will appear in the list box below the "Name" edit box.
The records will be saved to the dsk only if you validate all your modifications with the OK button.

The batch files can be run to obtain required results. See example of batch file:

Dynamic_Current_Wave_Batch.txt
Static_Current_Batch.txt

```
[BEGIN_ANALYSES_LIST]
Static_Current
[END_ANALYSES_LIST]
[RESET_DSS_FILES_RESULTS] NO
[SAVE_OUTPUT_TEXT_FILES] YES
3
[BEGIN_GRAPH]
[NAME]
[COEFF] 0.001
[TYPE] SSN
[OBJECT] Riser_2_FOW
[STEP] 0;5;
[VARIABLE] TENSIONEFFECT
[STAT_ONLY] 0
[TDP_ONLY] 0
[OUTPUT_FILE_NAME] AUTO
[END_GRAPH]
[BEGIN_GRAPH]
[NAME]
[COEFF] 1
[TYPE] SEV
[OBJECT] Riser_6
[CURV_ABS] 542.000000;
[STEP_BEGIN] SIMULATION_BEGINING
[STEP_END] SIMULATION_ENDING
[VARIABLE] STRESSBENDEXTERNAL
[SECTION_POINT] 10
[STAT_ONLY] 0
[OUTPUT_FILE_NAME] AUTO
[END_GRAPH]
```

Figure 2-3 : Example of batch file generated by the export tool for static analysis

Batch is launched and the following text files are created (example for Dynamic analysis):

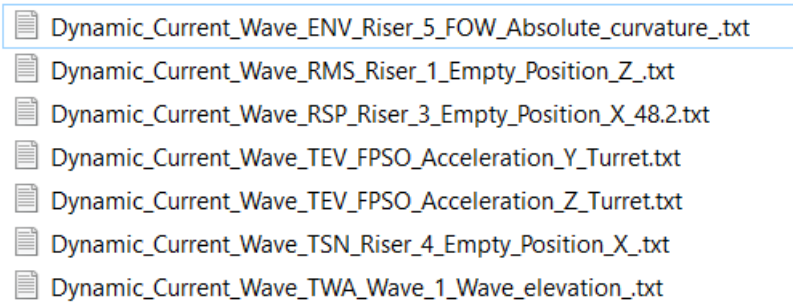


Figure 2-4 : Example of export txt files generated by the export tool

Depending on the computer configuration, the txt file may only be created at the end of the processing.

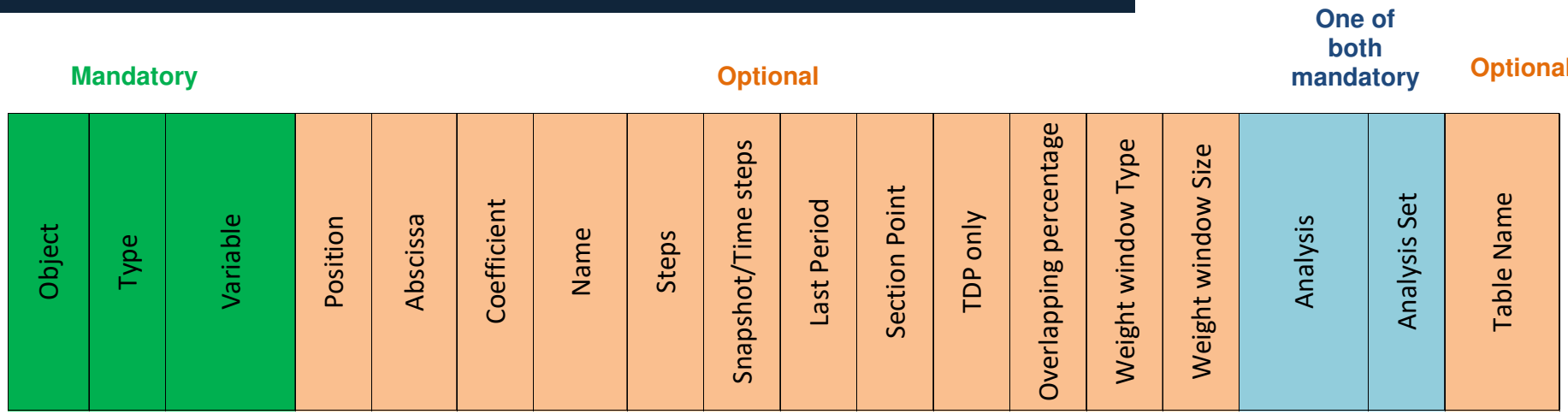


Figure 2-5 : Compulsory and optional data in table of export tool

2.3 LINE BY LINE

For each line of the table used in this example, the request is shown and explained and the corresponding result txt file is presented. **The export of SQL database is presented in 2.4.**

2.3.1 Static analysis, static snapshot

For the static analysis named “Static Current”, a static snapshot of the effective tension of Riser_2_FOW at static step 0 and 5 is required. A coefficient of 0.001 is applied on the results in the SQL database meaning that the tension will be directly output in kN. **This coefficient is not applied on values in txt files.**

Object	Type	Variable	Position	Abscissa	Coefficient	Name	Steps	Snapshot/Time steps	Last Period	Section Point	TDP only	Overlapping percentage	Weight window Type	Weight window Size	Analysis	Analysis Set	Table Name
Riser_2_FOW	SSN	TENSIONEFFECT			0.001		0;5								Static_Current		

```
Analysis     : Static_Current
Graph type   : Snapshot
Object       : Riser_2_FOW
Position     :
Comment      : Snapshot of Effective tension on line Riser_2_FOW
UNITS        : m                          N                          N
          0.252500      3.7945224891828932e+05   3.7945224889444408e+05
          0.757500      3.7731634558768990e+05   3.7731634556474816e+05
          1.360000      3.7501298764872178e+05   3.7501298762632610e+05
          2.060000      3.7295663455438870e+05   3.7295663453143084e+05
          2.760000      3.7162474507524760e+05   3.7162474505379953e+05
          3.499000      3.7074629854211205e+05   3.7074629851884674e+05
          4.277000      3.7001077194729442e+05   3.7001077192533546e+05
          5.055000      3.6927524894050282e+05   3.6927524891809077e+05
          5.833000      3.6853972956472123e+05   3.6853972954362282e+05
          6.611000      3.6780421384359122e+05   3.6780421382125048e+05
```

object_position	_Riser_2_FOW_Effective_tension_at_SI	_Riser_2_FOW_Effective_tension_at_SI
Filtre	Filtre	Filtre
0.2525	379.452248918289	379.452248894444
0.7575	377.31634558769	377.316345564748
1.36	375.012987648722	375.012987626326
2.06	372.956634554389	372.956634531431
2.76	371.624745075248	371.6247450538
3.499	370.746298542112	370.746298518847
4.277	370.010771947294	370.010771925335

Figure 2-6 : Static analysis SSN post-processing (top) and results in txt file (middle) and SQL database (bottom).

2.3.2 Static analysis, static step evolution

For the static analysis named “Static Current”, two static step evolutions are required
- of the external bending stress of Riser_6 at abscissa 542m at 10 section points.
- of the effective tension of Riser_2_FOW at abscissa between 600 and 700 m, every 20 m. (at the closest node)

Object	Type	Variable	Position	Abscissa	Coefficient	Name	Steps	Snapshot/Time steps	Last Period	Section Point	TDP only	Overlapping percentage	Weight window Type	Weight window Size	Analysis	Analysis Set	Table Name
Riser_6	SEV	STRESSBENDEXTERNAL		542						10					Static_Current		
Riser_2_FOW	SEV	TENSIONEFFECT		600.0<700.0:20.0											Static_Current		

```
Analysis     : Static_Current
Graph type   : Step evolution
Object       : Riser_6
Position     : 542.5 m
Comment      : Step evolution of Bending stress external on Riser_6 from file start to file end
UNITS        :                MPa                MPa                MPa                MPa                MPa                MPa                MPa                MPa                MPa                MPa                MPa
0.000000     1.281969774107895e+03  1.574771960633227e+03  1.266064782726978e+03  4.737638977827440e+02 -4.994987064233715e+02 -1.281969774107894e+03 -1.574771960633227e+03 -1.266064782726978e+03 -4.737638977827457e+02  4.994987064233715e+02
1.000000     1.281969721868751e+03  1.574771914764498e+03  1.266064760748959e+03  4.737639000858219e+02 -4.994986677673901e+02 -1.281969721868751e+03 -1.574771914764498e+03 -1.266064760748959e+03 -4.737639000858220e+02  4.994986677673901e+02
2.000000     1.281968352613391e+03  1.574771935022426e+03  1.266066162782334e+03  4.737661483655487e+02 -4.994964320077513e+02 -1.281968352613391e+03 -1.574771935022426e+03 -1.266066162782334e+03 -4.737661483655488e+02  4.994964320077510e+02
3.000000     1.281968345344267e+03  1.574771935132852e+03  1.266066170230133e+03  4.737661603059129e+02 -4.994964201356344e+02 -1.281968345344267e+03 -1.574771935132852e+03 -1.266066170230133e+03 -4.737661603059131e+02  4.994964201356343e+02
4.000000     1.281968330965323e+03  1.574771935347399e+03  1.266066184956221e+03  4.737661839186774e+02 -4.994963966554674e+02 -1.281968330965323e+03 -1.574771935347399e+03 -1.266066184956221e+03 -4.737661839186775e+02  4.994963966554673e+02
5.000000     1.281968333000560e+03  1.574771935318375e+03  1.266066182874022e+03  4.737661805786324e+02 -4.994963999775746e+02 -1.281968333000560e+03 -1.574771935318375e+03 -1.266066182874022e+03 -4.737661805786324e+02  4.994963999775746e+02
```

```
Analysis     : Static_Current
Graph type   : Step evolution
Object       : Riser_2_FOW
Position     : 601.5 m, 622.3 m, 643.1 m, 656.9 m, 677.7 m
Comment      : Step evolution of Effective tension on Riser_2_FOW from file start to file end
UNITS        :                          N                       N                       N                       N                       N
            0.000000      3.0506131910978234e+04   2.2223916422855258e+04   1.8380824894742982e+04   1.9742157789135545e+04   2.6485741896541564e+04
            1.000000      3.0506131907124967e+04   2.2223916428257107e+04   1.8380824893763471e+04   1.9742157789955159e+04   2.6485741896152933e+04
            2.000000      3.0506131906286875e+04   2.2223916422906525e+04   1.8380824894443416e+04   1.9742157788151904e+04   2.6485741891589063e+04
            3.000000      3.0506131906252689e+04   2.2223916422579765e+04   1.8380824895229591e+04   1.9742157791106616e+04   2.6485741898716551e+04
            4.000000      3.0506131909818661e+04   2.2223916422732091e+04   1.8380824894479621e+04   1.9742157789729550e+04   2.6485741893033475e+04
```

Figure 2-7 : Static analysis SEV post-processing and results

2.3.3 Dynamic analysis, envelope

For the dynamic analysis named “Dynamic_Current_Wave”, an envelope of the absolute curvature of Riser_5_FOW at abscissa 0; 50 and 100 m is required. The name of this export data is R5_ACurv and the name of the SQL table in which the result will be saved is table1.

Object	Type	Variable	Position	Abscissa	Coefficient	Name	Steps	Snapshot/Time steps	Last Period	Section Point	TDP only	Overlapping percentage	Weight window Type	Weight window Size	Analysis	Analysis Set	Table Name
Riser_5_FOW	ENV	CURVABS		0;50;100		R5_Acurv									Dynamic_Current_Wave		table1

```
Analysis     : Dynamic_Current_Wave
Graph type   : Envelop
Object       : Riser_5_FOW
Position     : from  0.00 m to 100.00 m
Comment      : Envelop of Absolute curvature on line Riser_5_FOW for abscissa range [0 : 100] m, from t = 0.000010 s to file end
UNITS        : m                    1/m                    1/m                    1/m
             0.287500      4.1945277407630880e-03   1.4021221052340024e-01   7.0111580000529458e-02
             0.862500      3.6802981737623936e-03   9.4821276622445314e-02   4.7149128443579713e-02
             1.450000      3.1441884310848176e-03   8.0180651869623240e-02   3.9470407879265569e-02
             2.050000      3.4058835540458372e-03   8.5748882222532727e-02   4.1672792324976435e-02
             2.650000      2.9205395046985705e-03   8.3388712280192220e-02   3.9754679205081377e-02
             3.250000      1.8320963185778155e-03   6.5299837560940516e-02   3.0079700524290948e-02
             4.125000      1.7514384953970120e-04   1.6820600863543769e-02   6.9302861524613533e-03
             5.275000      2.6252164469849868e-04   6.2723644015114351e-03   2.7247445052351192e-03
```

Figure 2-8 : Dynamic analysis ENV post processing and results

2.3.4 Dynamic analysis, time evolution

For the dynamic analysis named “Dynamic_Current_Wave”, a dynamic time evolution of the Y and Z acceleration at FPSO turret fairlead is required between time step 60 and 120 s with a step of 0.2 s. The names of this export data (used in SQL database) are FPSO_A_Y_Turret and FPSO_A_Z_Turret and the name of the SQL table in which the result will be saved in SQL database is table2.

Object	Type	Variable	Position	Abscissa	Coefficient	Name	Steps	Snapshot/Time steps	Last Period	Section Point	TDP only	Overlapping percentage	Weight window Type	Weight window Size	Analysis	Analysis Set	Table Name
FPSO	TEV	ACCELERATIONY	Turret			FPSO_A_Y_Turret		60<120:0.2							Dynamic_Current_Wave		table2
FPSO	TEV	ACCELERATIONZ	Turret			FPSO_A_Z_Turret		60<120:0.2							Dynamic_Current_Wave		table2

```
Analysis     : Dynamic_Current_Wave
Graph type   : Time evolution
Object       : FPSO
Position     : Turret
Comment      : Time evolution of Acceleration Y on FPSO at Turret from t = 60.000010 s to file end
UNITS        : s                        m/s2
           60.000010      4.3694132106833439e-01
           60.200010      5.0554510624322346e-01
           60.400010      5.6817272603982161e-01
           60.600010      6.2452038206525384e-01
           60.800010      6.7435388565751775e-01
           61.000010      7.1747370425984636e-01

Analysis     : Dynamic_Current_Wave
Graph type   : Time evolution
Object       : FPSO
Position     : Turret
Comment      : Time evolution of Acceleration Z on FPSO at Turret from t = 60.000010 s to file end
UNITS        : s                        m/s2
           60.000010      -8.4551507745948895e-01
           60.200010      -8.0561555701467047e-01
           60.400010      -7.5912859820089207e-01
           60.600010      -7.0780866849412083e-01
           60.800010      -6.5329840542570150e-01
           61.000010      -5.9707284559658769e-01
           61.200010      -5.4039491249696037e-01
           61.400010      -4.8428220619733253e-01
           61.600010      -4.2948478336292262e-01
           61.800010      -3.7647356101037716e-01
           62.000010      -3.2543915565400627e-01
           62.200010      -2.7630126116392595e-01
           62.400010      -2.2872892316718374e-01
           62.600010      -1.8217213551901931e-01
           62.800010      -1.3590521074034301e-01
           63.000010      -8.9080366781573286e-02
```

Figure 2-9 : Dynamic analysis TEV post processing and results

2.3.5 Dynamic analysis, dynamic snapshot

For the dynamic analysis named “Dynamic_Current_Wave”, a dynamic snapshot of the X Position of the Riser_4_Empty at timestep 120s is required. The name of this export data in SQL database is R4_X.

Object	Type	Variable	Position	Abscissa	Coefficient	Name	Steps	Snapshot/Time steps	Last Period	Section Point	TDP only	Overlapping percentage	Weight window Type	Weight window Size	Analysis	Analysis Set	Table Name
Riser_4_Empty	TSN	POSITIONX				R4_X		120							Dynamic_Current_Wave		

```
Analysis     : Dynamic_Current_Wave
Graph type   : Snapshot
Object       : Riser_4_Empty
Position     :
Comment      : Snapshot of Position X on line Riser_4_Empty
UNITS        : m                          m
             0.000000      -4.5956651832145631e+01
             0.600000      -4.5984621624780871e+01
             1.200000      -4.6009646403076502e+01
             1.800000      -4.6032630879277640e+01
             2.400000      -4.6053421414058697e+01
             3.000000      -4.6071548581209207e+01
             3.600000      -4.6086634914654553e+01
             5.300000      -4.6118955420368003e+01
             7.000000      -4.6146835779293312e+01
             9.200000      -4.6185527715022296e+01
            11.400000      -4.6225419407132968e+01
```

Figure 2-10 : Dynamic analysis TSN post processing and results

2.3.6 Dynamic analysis, time evolution of wave

For the dynamic analysis named “Dynamic_Current_Wave”, a dynamic time evolution of the wave elevation for the last 6 wave periods, is required. The name of this export data is WW_El.

Object	Type	Variable	Position	Abscissa	Coefficient	Name	Steps	Snapshot/Time steps	Last Period	Section Point	TDP only	Overlapping percentage	Weight window Type	Weight window Size	Analysis	Analysis Set	Table Name
Wave_1	TWA	WAVEELEVATION				WW_El			6						Dynamic_Current_Wave		

```
Analysis     : Dynamic_Current_Wave
Graph type   : Time evolution
Object       : Wave_1
Position     :
Comment      : Time evolution of Wave elevation at point (0.0 m, 0.0 m) from t = 48.0 s to t = 120.0 s
UNITS        : s                          m
          48.000010      2.9999999999554907e+00
          48.200010      2.9835639776005292e+00
          48.400010      2.9344394034069774e+00
          48.600010      2.8531644964987155e+00
          48.800010      2.7406297217786619e+00
          49.000010      2.5980680338087683e+00
          49.200010      2.4270413683016248e+00
          49.400010      2.2294235292256417e+00
          49.600010      2.0073796590162822e+00
          49.800010      1.7633425168221086e+00
          50.000010      1.4999858246859514e+00
          50.200010      1.2201949736862616e+00
          50.400010      9.2703541098809461e-01
          50.600010      6.2371905416188800e-01
          50.800010      3.1356910074190081e-01
          51.000010      -1.6381422087612242e-05
          51.200010      -3.1360168410778461e-01
          51.400010      -6.2375110105929910e-01
          51.600010      -9.2706657030451312e-01
```

Figure 2-11 : Dynamic analysis wave elevation post processing and results

2.3.7 Dynamic analysis, RMS values along the riser

For the dynamic analysis named “Dynamic_Current_Wave”, a snapshot spectral curve of the position Z (=RMS along the line) of the Riser_1_Empty at abscissa 100 m is required. The name of this export data is RMS_Z. The type of the weight window (=Hanning) for spectral analysis as well as its size (=50%) is given.

Object	Type	Variable	Position	Abscissa	Coefficient	Name	Steps	Snapshot/Time steps	Last Period	Section Point	TDP only	Overlapping percentage	Weight window Type	Weight window Size	Analysis	Analysis Set	Table Name
Riser_1_Empty	RMS	POSITIONZ		100		RMS_Z						50	hanning	1024	Dynamic_Current_Wave		

```
Analysis     : Dynamic_Current_Wave
Graph type   : Snapshot
Object       : Riser_1_Empty
Position     :
Comment      : Snapshot statistics Snapshot of Position Z on line Riser_1_Empty
UNITS        : m                          m
            0.000000      2.3372257050534744e+00
            0.630000      2.3359368366638220e+00
            1.260000      2.3340687980188268e+00
            1.860000      2.3319441048114125e+00
            2.460000      2.3295603714971431e+00
            3.060000      2.3269934805615491e+00
            3.660000      2.3243597932936577e+00
            5.330000      2.3173288454154202e+00
            7.000000      2.3107787075092308e+00
            9.200000      2.3019782062502712e+00
           11.400000      2.2929294243272453e+00
           13.600000      2.2836247232728515e+00
           15.800000      2.2740846507087107e+00
           18.000000      2.2644311785884157e+00
           20.200000      2.2548248228330321e+00
```

Figure 2-12 : Dynamic analysis post processing, RMS values along the riser and results

2.3.8 Dynamic analysis, spectral curve

For the dynamic analysis named “Dynamic_Current_Wave”, a spectral curve (response spectrum) of the position X of the Riser_3_Empty at abscissa 50m is required. The name of this export data is RSP_X. The type of the weight window (=rectangle) for spectral analysis as well as its size (=50%) is given.

Object	Type	Variable	Position	Abscissa	Coefficient	Name	Steps	Snapshot/Time steps	Last Period	Section Point	TDP only	Overlapping percentage	Weight window Type	Weight window Size	Analysis	Analysis Set	Table Name
Riser_3_Empty	RSP	POSITIONX		50		RSP_X						50	rectangle	1024	Dynamic_Current_Wave		

```
Analysis     : Dynamic_Current_Wave
Graph type   : Response spectrum
Object       : Riser_3_Empty
Position     : 48.2 m
Comment      : Response spectrum of Position X on Riser_3_Empty from file start to file end
UNITS        : rad/s                    (m)2.s
5.2359877559830993e-02   9.1742688239847936e-01
1.0471975511966199e-01   4.6472626431567121e-01
1.5707963267949299e-01   3.0580572454927557e-01
2.0943951023932397e-01   2.3380141642835958e-01
2.6179938779915496e-01   1.9917260511503448e-01
3.1415926535898597e-01   1.8217063529382121e-01
3.6651914291881693e-01   1.7172451627461163e-01
4.1887902047864795e-01   1.6108694611591484e-01
4.7123889803847896e-01   1.4616552943843134e-01
5.2359877559830992e-01   1.4615845413355586e+01
```

Figure 2-13 : Dynamic analysis post processing, spectral curves and results

2.3.9 Static and dynamic analysis, looking at TDP (touchdown point)

Several results can be investigated at TDP. See table below

Line 1: step evolution of TDP lying length on Riser_5_FOW of simulation “Static_Current”

Line 2: time evolution of TDP abscissa on Riser_5_FOW of simulation “Dynamic_Current_Wave”

Line 3: Step evolution of Bending stress external on Riser_6 at 1 section point at TDP

Line 4: Snapshot of Effective tension on line Riser_5_FOW at step 25 at TDP

Riser_5_FOW	Riser_6	Riser_5_FOW	Riser_5_FOW	Object
SSN	SEV	TEV	SEV	Type
TENSIONEFFECT	STRESSBENDEXTERNAL	TDP_ABSCISSA	TDP_LYING_LENGTH	Variable
				Position
	TDP	0	0	Abscissa
				Coefficient
				Name
25				Steps
				Snapshot/Time steps
				Last Period
	1			Section Point
TDP				TDP only
				Overlapping percentage
				Weight window Type
				Weight window Size
Static_Current	Static_Current	Dynamic_Current_Wave	Static_Current	Analysis
				Analysis Set
				Table Name

```
Analysis     : Static_Current
Graph type   : Step evolution
Object       : Riser_5_FOW
Position     : 0.0 m
Comment      : Step evolution of TDP lying length on Riser_5_FOW from file start to file end
UNITS        :
           0.000000      2.8000000000000000e+02
           1.000000      2.8000000000000000e+02
           2.000000      2.8000000000000000e+02
           3.000000      2.8000000000000000e+02
           4.000000      2.8000000000000000e+02
           5.000000      2.8000000000000000e+02
```

```
Analysis     : Dynamic_Current_Wave
Graph type   : Time evolution
Object       : Riser_5_FOW
Position     : 0.0 m
Comment      : Time evolution of TDP abscissa on Riser_5_FOW from file start to file end
UNITS        : s
           0.000010      8.8500000000000000e+02
           0.200010      8.8500000000000000e+02
           0.400010      8.8500000000000000e+02
           0.600010      8.8500000000000000e+02
           0.800010      8.8500000000000000e+02
           1.000010      8.8500000000000000e+02
```

```
Analysis     : Static_Current
Graph type   : Step evolution
Object       : Riser_6
Position     : TDP
Comment      : Step evolution of Bending stress external on Riser_6 from file start to file end
UNITS        :                          MPa
           0.000000      -1.3803575517699085e+00
           1.000000      -1.3803867623230452e+00
           2.000000      -1.3801525301676580e+00
           3.000000      -1.3084658729083094e+00
           4.000000      -1.3083860300717216e+00
           5.000000      -1.3083698981516168e+00
           6.000000      -3.0143482428819226e+00
           7.000000      -1.3393003376730566e+00
           8.000000      -1.3384296609451893e+00
Analysis     : Static_Current
Graph type   : Snapshot
Object       : Riser_5_FOW
Position     : TDP
Comment      : Snapshot of Effective tension on line Riser_5_FOW at step 25
UNITS        : m                              N
         887.500000      1.7079652680229003e+04
```

Figure 2-14 : Static and dynamic analysis post processing and results

2.3.10 Dynamic analysis set, time series

For each analysis in the dynamic analysis set named “AnalysisSet”, a dynamic time evolution of the effective tension of Riser_6 at abscissa 100 and 200 m is required.

Object	Type	Variable	Position	Abscissa	Coefficient	Name	Steps	Snapshot/Time steps	Last Period	Section Point	TDP only	Overlapping percentage	Weight window Type	Weight window Size	Analysis	Analysis Set	Table Name
Riser_6	TEV	TENSIONEFFECT		100;200												AnalysisSet	

```
Analysis     : AnalysisSet_1
Graph type   : Time evolution
Object       : Riser_6
Position     : 98.5 m * 198.0 m
Comment      : Time evolution of Effective tension on Riser_6 from file start to file end
UNITS        : s                          N                          N
             0.000010      2.7836791184306028e+05   2.4009925659946029e+05
             0.200010      2.7772991617372469e+05   2.3945888160313063e+05
             0.400010      2.7745595886595803e+05   2.3915413535076726e+05
             0.600010      2.7777500473240926e+05   2.3947551867580571e+05
             0.800010      2.7830601224118780e+05   2.4002074946545798e+05
             1.000010      2.7862309654408740e+05   2.4034127905089952e+05
             1.200010      2.7850853892390215e+05   2.4022762466409884e+05
```

```
Analysis     : AnalysisSet_2
Graph type   : Time evolution
Object       : Riser_6
Position     : 98.5 m * 198.0 m
Comment      : Time evolution of Effective tension on Riser_6 from file start to file end
UNITS        : s                          N                          N
            0.000010      2.7836791184459039e+05   2.4009925660237638e+05
            0.200010      2.7772543502423627e+05   2.3945557333632410e+05
            0.400010      2.7741344405552204e+05   2.3911831459678942e+05
            0.600010      2.7760741173202044e+05   2.3932866368319251e+05
            0.800010      2.7791668685155455e+05   2.3966944105919867e+05
Analysis     : AnalysisSet_3
Graph type   : Time evolution
Object       : Riser_6
Position     : 98.5 m * 198.0 m
Comment      : Time evolution of Effective tension on Riser_6 from file start to file end
UNITS        : s                          N                          N
            0.000010      2.7836791184191179e+05   2.4009925659977755e+05
            0.200010      2.7772470298269577e+05   2.3945507045328838e+05
            0.400010      2.7741158511718869e+05   2.3911881733475425e+05
            0.600010      2.7763455902686395e+05   2.3935231114027469e+05
            0.800010      2.7799132337009389e+05   2.3973618388574410e+05
```

Figure 2-15 : Dynamic analysis post processing, analysis set, time series and results

2.4 EXPORT IN SQL DATABASE

Results can also be output in a SQL database using the following command line, with the most recent version of Deeplines (location of the DeeplinesGUI should be changed if Deeplines is not installed in its defaults folder):

C:\Principia\Deeplines\DeeplinesV*X.X.X*\Exec\DeepLinesGUI.exe -batch_sql name_of_Batch.txt

The SQL files are saved in an export_sql folder.

Depending on the computer configuration, the SQL file may only be created at the end of the processing.

Then SQL datafile can be open for example with DB Browser for SQLite. It can also be accessed with a python script.

In the SQL database, the table and variable names can be used as shown below:

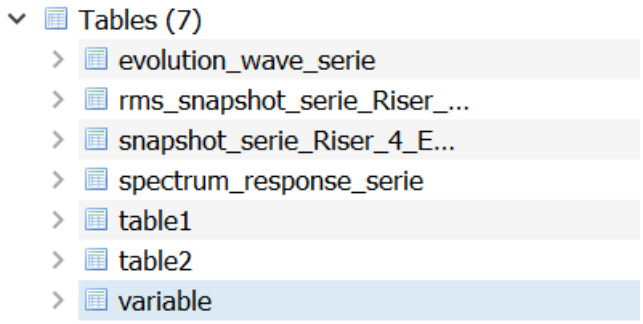


Table : table2

	time_scale	FPSO_A_Y_Turret_at_Turret	FPSO_A_Z_Turret_at_Turret
	Filtre	Filtre	Filtre
1	60.0000100000006	0.436941321068334	-0.845515077459489
2	60.2000100000006	0.505545106243224	-0.805615557014671
3	60.4000100000006	0.568172726039822	-0.759128598200892
4	60.6000100000006	0.624520382065254	-0.707808668494121
5	60.8000100000006	0.674353885657518	-0.653298405425702
6	61.0000100000006	0.717473704259846	-0.597072845596588
7	61.2000100000006	0.753683724809677	-0.54039491249696

	time_scale	WW_El_at_Default
	Filtre	Filtre
1	48.000009999999	2.99999999995549
2	48.200009999999	2.98356397760053
3	48.400009999999	2.93443940340698
4	48.600009999999	2.85316449649872
5	48.800009999999	2.74062972177866
6	49.000009999999	2.59806803380877
7	49.200009999999	2.42704136830162

Figure 2-16 : Looking at the SQL database

3 FUNCTIONS

The window “export time series” also includes a tab named “Function”: this tab allows performing calculations on the export variables using Python function. Calculations will be done on the data saved in the SQL database.
The example uses a function offset.py which adds 100 to the value in the initial unit. This function can be easily modified to do any required computation on results.

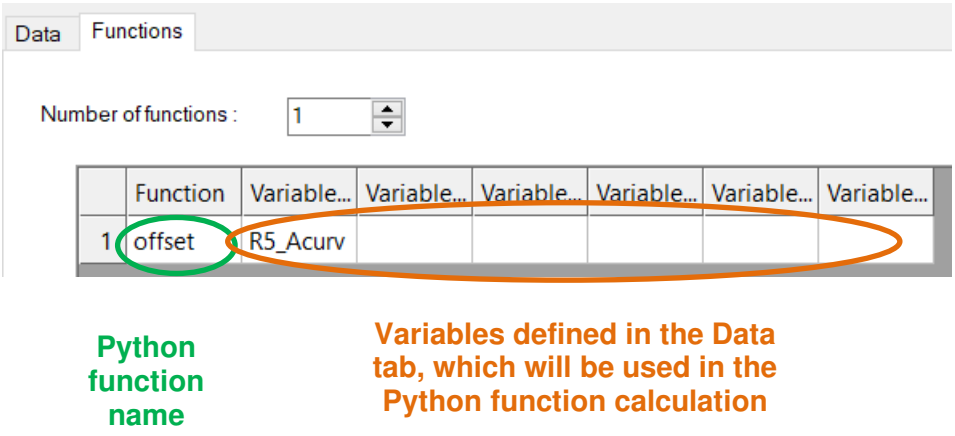


Figure 3-1 : Functions used to perform calculation on export variables

```
import sys


def Offset(listTimeSteps, listVar1Data, listVar2Data, listVar3Data, listVar4Data, listVar5Data, listVar6Data, fCoeff):

    listInput = [listVar1Data, listVar2Data, listVar3Data, listVar4Data, listVar5Data, listVar6Data]
    listOutput = []
    #Dummy offset value
    fOffsetValue = 100
    for i in range(6):
        listOutput.append([])
    for i in range(6):
        #Build output list from input data and offset value
        for x in listInput[i]:
            listOutput[i].append((x + fOffsetValue) * fCoeff)
    #Return output list
    return listOutput
```

Figure 3-2 : Python function Offset.py used in this example