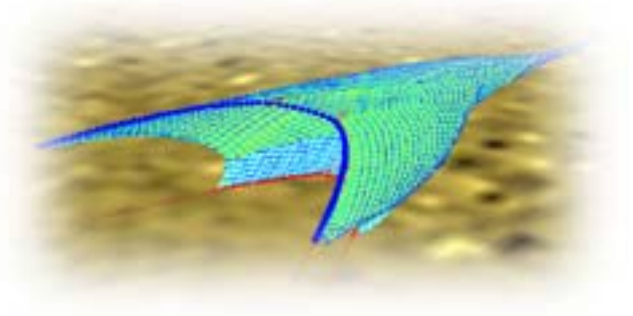
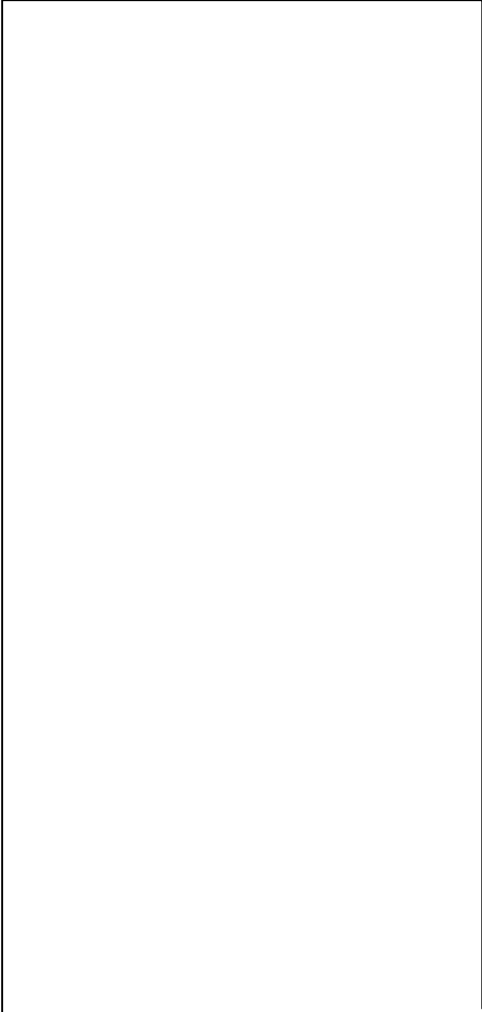


# Exercises DynamiT



## DynamiT

Ifremer

Training exercises  
for new users

Comparing different numerical  
models of a trawl

DynamiT's data-processing module uses globalized meshings which represent (model) the actual trawl gear to run a simulation. It is compulsory to replace the actual trawl gear by a virtual model with much less meshes to enable "fast" calculations. However, different numerical meshes, especially more or less fine, can model the same trawl gear. The results and data-processing time achieved for the various mesh opening sizes are now compared.

- Open TRG file of the Lofoten test trawl (tutorial 1).
- Build file SIM and start data-processing.

The mesh size defined with tutorial 1 had less than 1000 bars.

- Wait for convergence to occur and note the data-processing time.

Return to TRG file window and alter meshing so as :

- to comply with the criteria of a « proper meshing »,
- to obtain around 2500 bars.

- Start the computation.
- Wait for convergence to occur.
- During that time, enter the number of the knots which will be used to generate the global results.

Compare the processing time and the global results (geometry and stress).

Compare the simulated durations necessary for the trawl to achieve a steady shape.

Compared results :

« Rough » meshing	« Fine » meshing
<i>Trawler speed</i> : 3.50 knots	<i>Trawler speed</i> : 3.50 knots
<i>Heading</i> : 0°	<i>Heading</i> : 0°
<i>Number of bars / nodes</i> : 978 / 756	<i>Number of bars / nodes</i> : 2340 / 1760
<i>Min / max tension</i> : -89.4 KgF / 2644.9 KgF	<i>Min / maxi tension</i> : -142.3 KgF / 2662.5 KgF
<i>Vertical / Horizontal opening</i> : 2.9 m / 16.8 m	<i>Vertical / Horizontal opening</i> : 3.0 m / 16.9 m
<i>Door to door distance</i> : 60.1 m	<i>Door to door distance</i> : 59.6 m
<i>Otter board immersion</i> : PB= 149.0 m, SB=149.0 m	<i>Otter board immersion</i> : PB= 149.0 m, SB=149.0 m

Some of the results of the two simulations only differ by 5%. This does not mean that it would be the same case if the actual parameters were measured. The difference between reality and data-processing results may be due to some physical data the simulation does not take into account and also to « natural » conditions which are beyond control (such as the speed of the boat, the possible undercurrent, ...).

An other example for a different trawl is given in the table bellow :

<b>Number of bars / nodes</b>	<b>583 / 475</b>	<b>1076 / 845</b>	<b>4749 / 3617</b>	<b>6030 / 4576</b>	<b>8693 / 6570</b>	<b>12463 / 9387</b>
<b>Vertical opening (m)</b>	4.0	3.8	3.8	3.8	3.7	3.8
<b>Horizontal opening</b>	16.5	16.1	16.4	16.3	16.5	16.4
<b>Otter boards opening</b>	56.7	55	56.2	56.3	56.9	56.7
<b>Warp tension / total towing traction (kgF)</b>	2854.8 2878.2 5489.7	2920.9 2920.1 5596.0	2900.3 2870.1 5526.6	2858.0 2890.3 5504.7	2879.0 2849.9 5485.9	2882.3 2855.4 5494.5
<b>Projected swept surface (m<sup>2</sup>)</b>	46.6	44.0	44.5	43.8	43.8	44.0
<b>Swept water volume per second (m<sup>3</sup>/s)</b>	83.8	79.2	80.1	78.8	78.9	79.2
<b>1500 MHz CPU approx. Time (minutes)</b>	3					4200

Such a comparison can be carried out for any kind of trawl.

A good way to carry out a simulation for a new trawl is to start with a very low model and, when a stable configuration is reached, after trawl and rig adjustments ..., to end the study with a high model which will be more suitable for presentations.