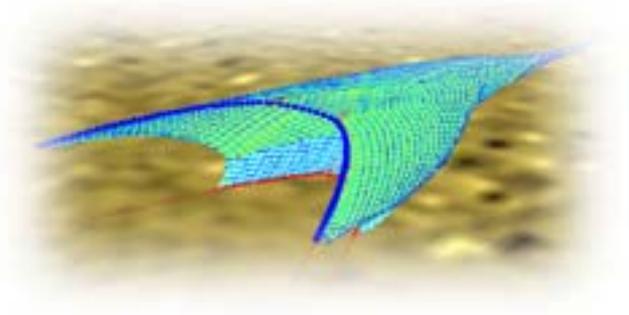
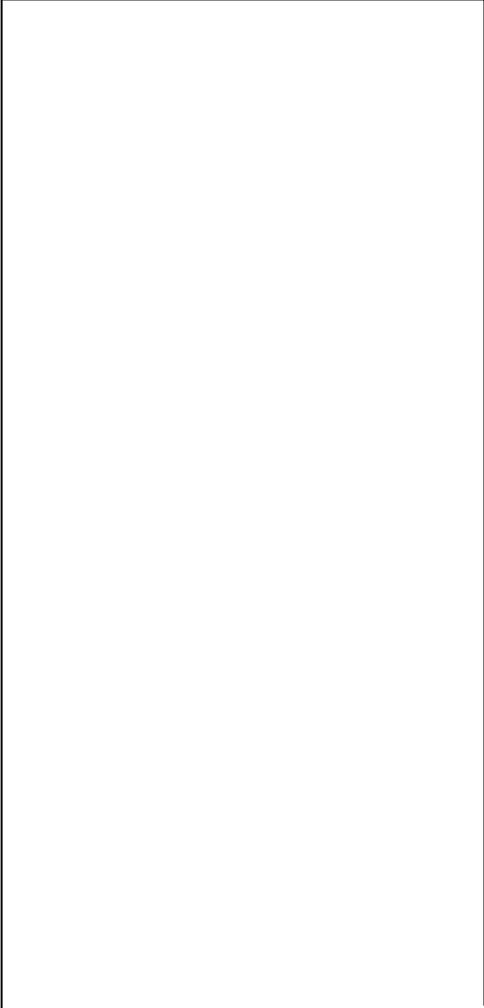


Exercises DynamiT



DynamiT

Ifremer

Training exercises
for new users

Studying the influence of numerical
parameters

This tutorial shows the influence of the calculation numerical parameters. The objective is to enable the user to choose or modify the time step and other parameters when needed, before and especially during a simulation.

We suppose the tutorial “*VirtualBottomTrawl*” has been understood. We start from the file *Lofoten.sim* resulting from this tutorial.

1.1 Modifying the parameters during a simulation

1.1.1 Calculation parameters : time step

- Start the simulation.

Modify the calculation parameters and observe the effect on the results :

- Modify the images output rate : 0.5 second instead of 5 seconds. Why is it interesting to modify this rate ?
- Modifier le time step : 0.03 second instead of 0.005 second.

What are the two major conclusions ? (on the image and on the data related to the calculation progress).

The time step maximum value is mainly function of the length and stress of the shortest bar. The “dt” value must be reduced if this length decreases or if the stress increases. Correct a time step leads to a value of R1 of 0.01 to 0.001 (i.e. $1e-2$ to $1e-3$) and a number of iterations below 10 to 20 at each time step. Try not to use a value lower than 0.003 for “dt” (processing would take too much time) but prefer to improve the meshing.

- Keep increasing the time step up to 0.06 and more. In the end, the calculation crashes.
- Stop the processing.
- Enter a reasonable time step following the rules above, start calculation again from « correct » a result.

This is the way to proceed when the initial time step is too big.



1.1.2 Calculation parameters : equation remainder

This parameter has less influence than the time step but can be important in particular applications : producing a video animation, scaled model calculations for instance.

- Run a converged simulation.
- Use the default calculation parameters except for “information output period” : 500.
- After some iterations, change “equation remainder” to 0.05.
- If needed, use a different colour scale, alternatively, use the filtered volume as a convergence indicator.
- What are the two major conclusions ?



This parameter governs the accuracy of calculations : low values give high accuracy and longest calculation time. Greater values give low accuracy and faster calculation.