UseCase.0002 (1.0)

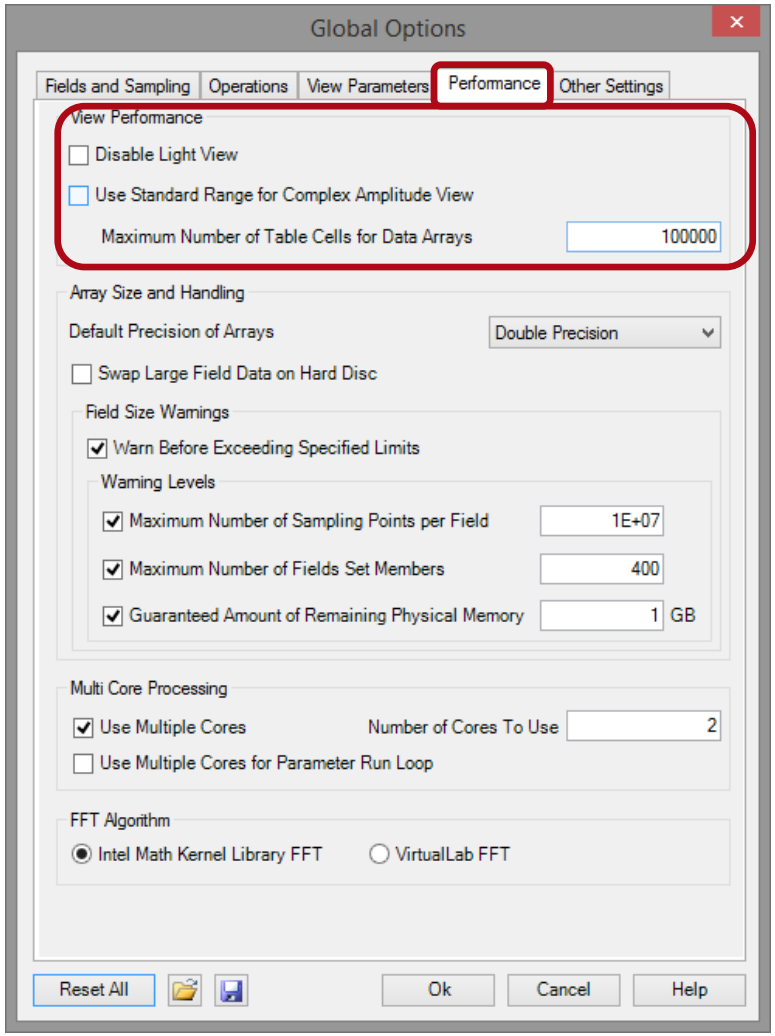
Performance Settings - Recommendations

Keywords: performance, time, memory, consuming, large data, parallelization, CPU, core, FFT algorithm, RAM, warning, sampling

Description

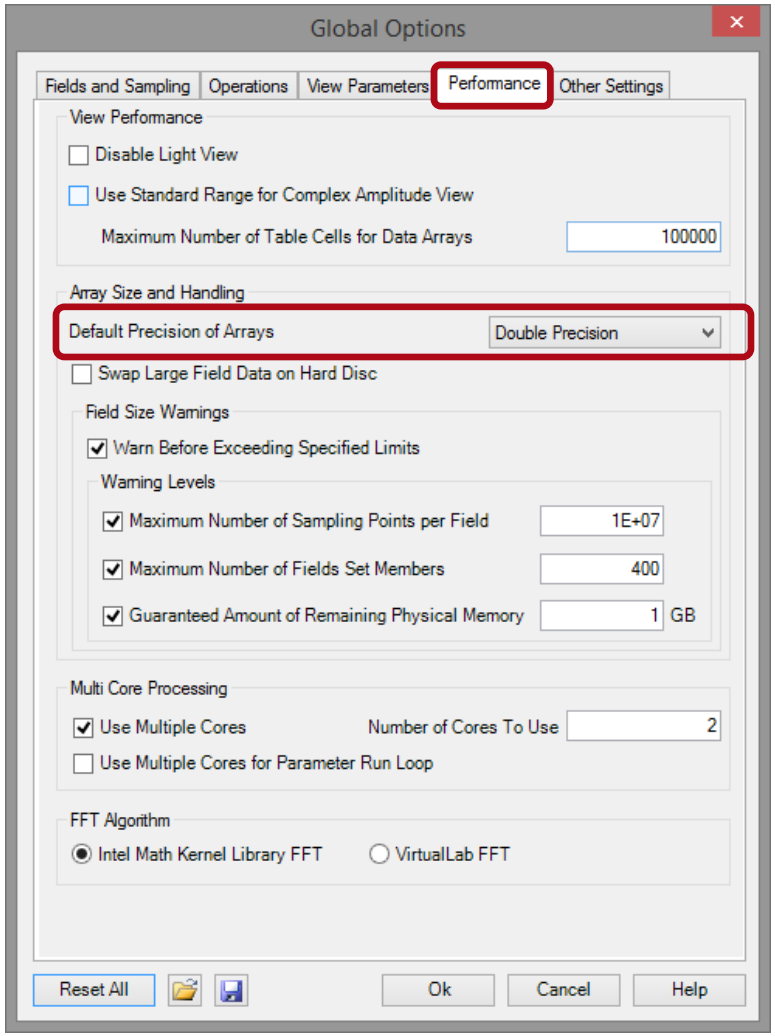
- This use case explains the configuration option on the **Performance** tab of the global options dialog.
- It also demonstrates how the performance settings shall be set for a specific PC configuration.
- The settings are mainly dependent on the amount of RAM which is given and the number of cores of the CPU that is used.

Performance Setting: View



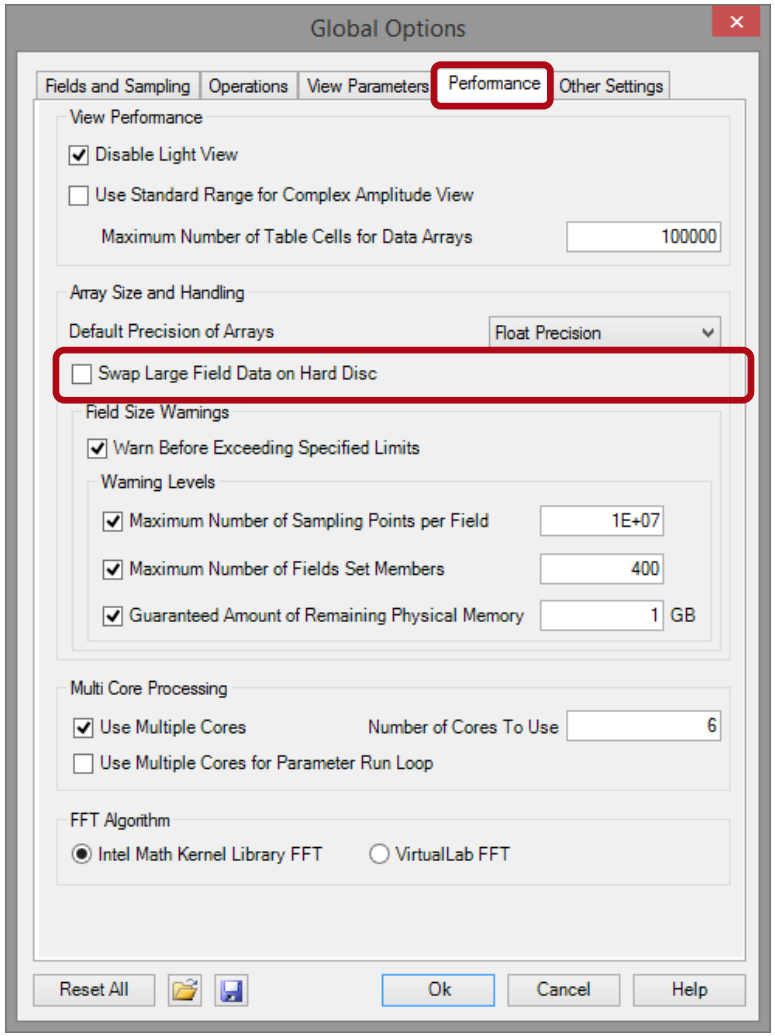
- At the top part the user can define the default view parameter that influence the performance.
- In case you work with large fields it is recommended to disable the light view.
- With checked standard range option no min/max values are calculated, instead default scaling is used. On demand the auto or user defined scale can always be displayed.
- The maximum number of table cells limits how much data is automatically displayed. If also larger arrays should be displayed, this can always be triggered by a button click.

Performance Setting: Array Size and Handling



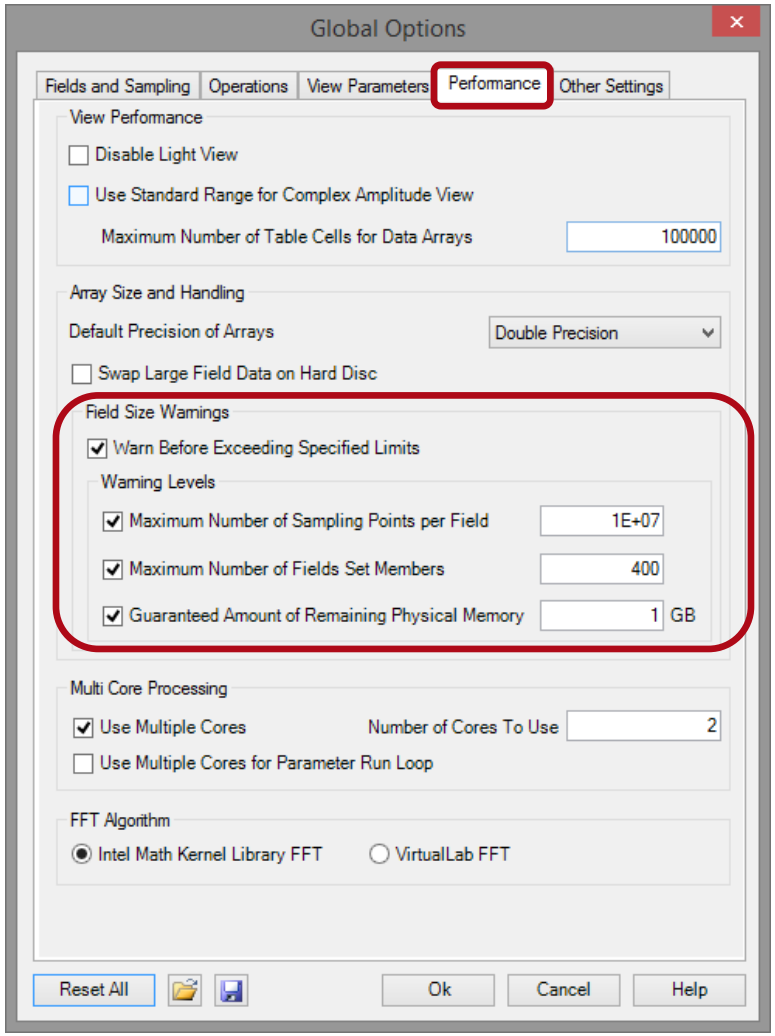
- The user can also select the default precision of arrays.
- If the simulation requires a very high accuracy (e.g. pulse simulation) it should be set to Double, otherwise Float can be used.
- Internally VirtualLab always calculates in Double precision, but the generation of the output fields can be scaled down by selecting Float precision here.

Performance Setting: Array Size and Handling



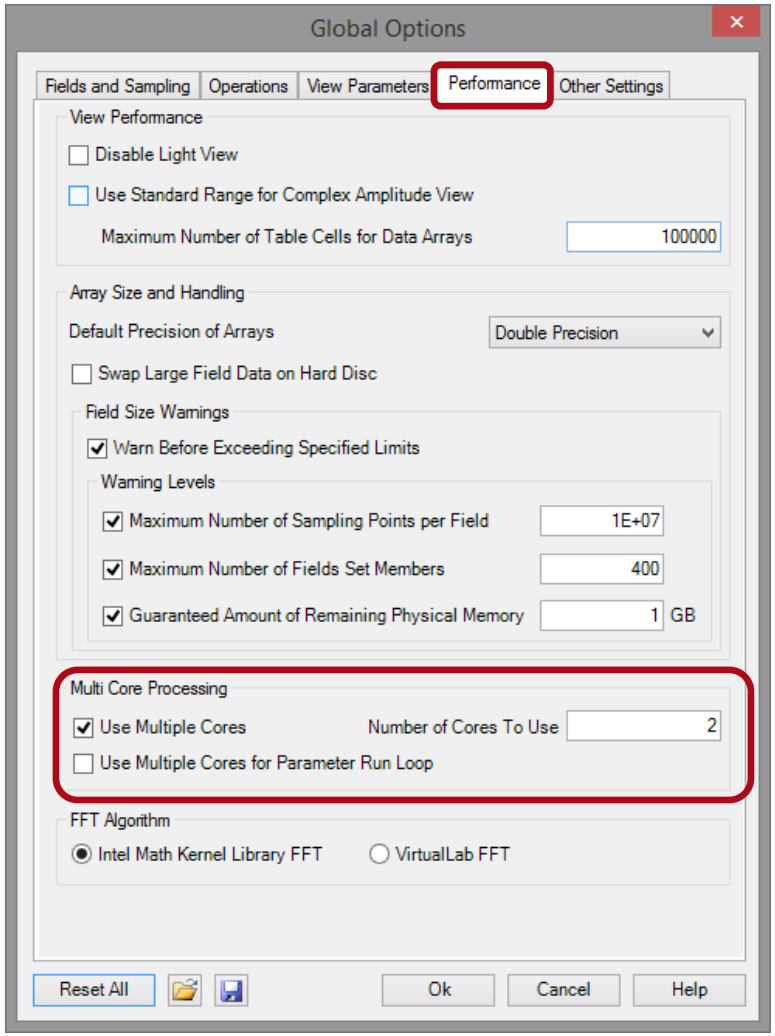
- For different objects and algorithms within VirtualLab a mechanism to swap data to hard disc is implemented.
- This allows that not the complete data has to be stored in the RAM. On the other hand this option may slow down your simulation.
- Examples for such object are
  - Harmonic Fields Set
  - Parameter Run

Performance Setting: Array Size and Handling



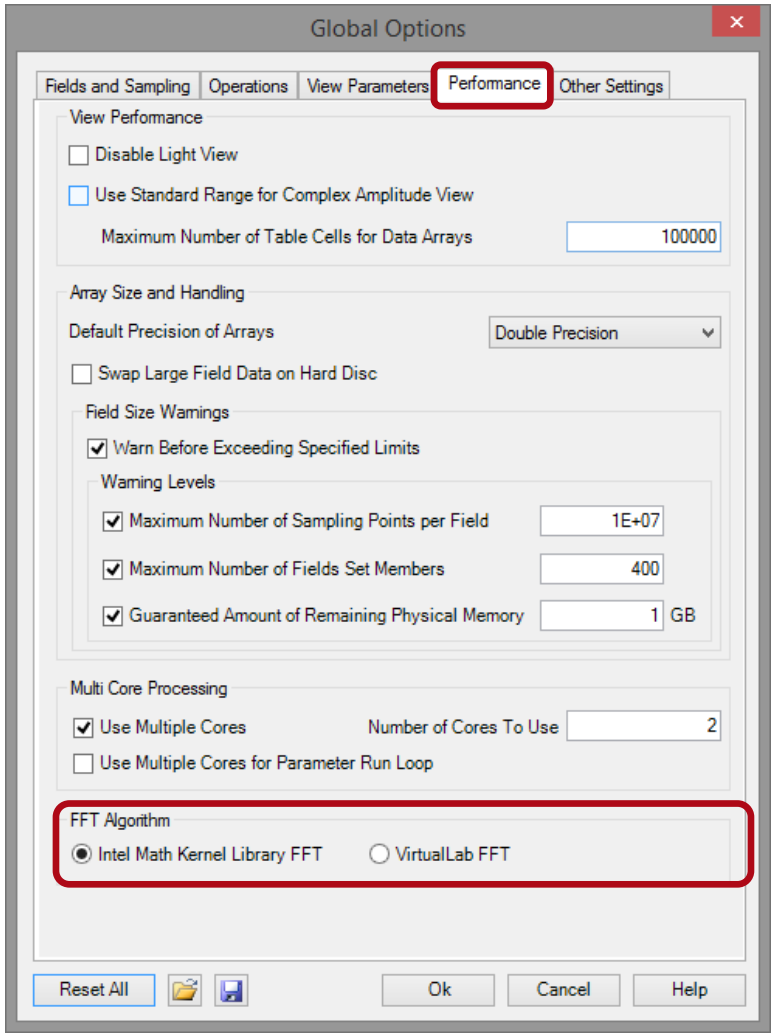
- The user can also define whether he like to be warned if some fields are too large or a harmonic fields set has too many members.
- This options are mostly evaluated within the source.
- In addition, the user can define a guaranteed amount of RAM which shall remain available for other programs.
- For most cases the initial defaults from VirtualLab are appropriate.

Performance Setting: Multi Core Processing



- VirtualLab is enabled to use parallel computing for divers computations and simulations.
- The user can specify how many CPU cores shall be used.
- A rule of thumb is to use here (Number of Cores - 1). So one core remains available for the operating system.
- It is also possible to specify whether the loops of the Parameter Run shall be run in parallel.

Performance Setting: FFT Algorithm



- Due to the fact that the FFT algorithm is of central concern for solving diffraction equations, VirtualLab has two build in versions to perform a FFT.
- We recommend to use the Intel Math Kernel Library FFT as default.

Summary

- The setup of the performance settings for VirtualLab depends on the simulation task which should be realized as well as the computer configuration which is used to run VirtualLab.

- By a clever selection of the settings the user can define the best compromise between performance and memory consumption for his specific case.