Solve and Cancel Solve

Solve

Pressing Solve begins the process of solving the system of equations associated with your model. The program constructs the system of equations and then invokes a direct LU solver to determine the unknown strength parameters associated with wells, line elements, and area sink elements. Boundary conditions like river boundaries in unconfined aquifers generate nonlinear equations. When a model contains some nonlinear equations, the solution is found by repeated iterations, where the non-linear equations are linearized (an approximation) with the linearization updated at each iteration. The program displays iteration information in the run log as iterations proceed and when they terminate due to one of two conditions: 1) the solution converged within the check settings, or 2) the solution did not converge within the check settings but stopped iterating after the maximum number of iterations. The solve process is executed on a background thread, so you may continue with some input editing tasks as the solve process runs. You can abort the solve process by selecting Cancel Solve.

Solve must be executed after any change to the Model Input so that results examined in the Make Plot or Analysis menus reflect the current input. Changes to the Plot Input do not require re-solving. In transient models, changes to Analysis Input/Hydrograph Points or Analysis Input/Transient Line Conditions requires you to re-establish the initial heads files and to Solve again before running related items under the Analysis menu.

Solving takes longer for more complex simulations with more equations. It is good modeling practice to start with a relatively simple model and incrementally add complexity, so you can monitor the level of complexity, number of equations, and solve times as you proceed. The spatially-variable area source/sinks can add large numbers of equations to the system if the spacing of basis points is small. To save computation time, you can increase the basis point spacing of spatially-variable area sinks and reduce the number of parameters per line on line boundaries. When you want to make a final, presentation-quality model, you can alter these for more accuracy and better aesthetics.

Another way to keep computation minimal and start simple is to make as much of the model linear as possible (linear boundary conditions can solve in a single iteration, as opposed to non-linear boundary conditions). You can do this by making domains confined (fixed T and saturated thickness). You can also employ head-specified line boundaries (linear) instead of river line boundaries (often nonlinear). For complex problems, it probably makes sense to do most of the modeling work in with linear features and then change to nonlinear features later in the modeling

process.

You may adjust Solve Settings and Check Settings to control the Solve process.

Cancel Solve

This allows you to abort the ongoing solve process. Use this if you don't want to wait for solve to finish and you know the input is not what you want. If you select Make Plot/All Selected Features after canceling the solve process, Anaqsim will attempt to make a plot with the available solution. For example, a transient solution canceled after 5 time steps were complete will be able to display plots and pathlines up through this point in the simulation. In a steady simulation, the plot will show the last iteration results before canceling.

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