



Time Saving Tips for STAR-CCM+ v9.04



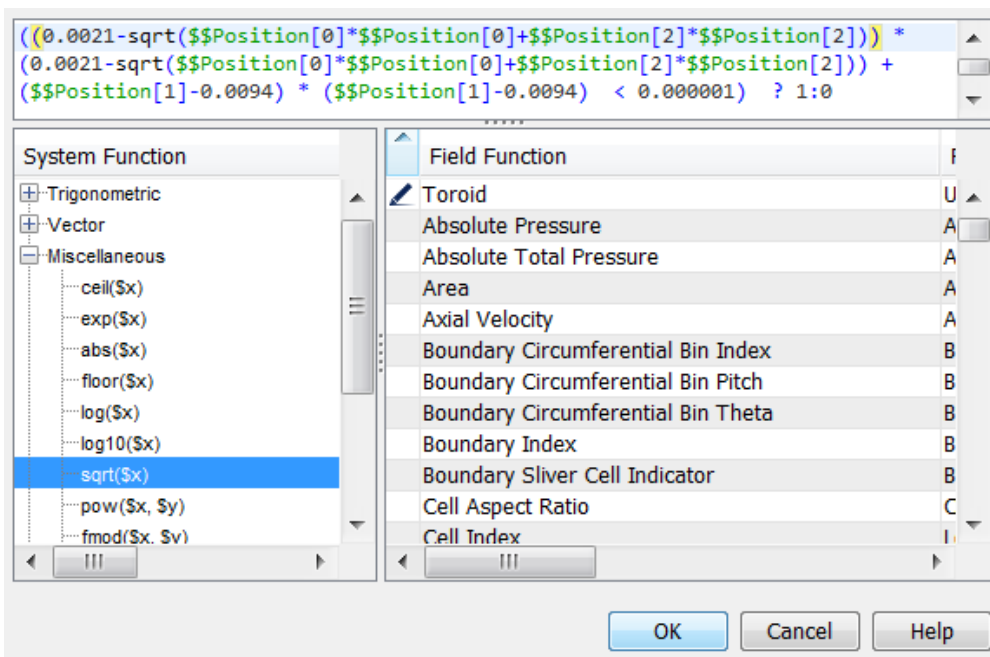
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Many of us spend long hours (or what feels like long hours) in front of our STAR-CCM+ product interface and naturally, the question comes to mind ??How can I make things easier?? After all, as engineers, we are almost compelled to find elegant solutions, so most of us would leap at the opportunity to reduce time consuming interactions with the software. As luck would have it, STAR-CCM+ v9.04 is packed with a range of new time-saving features that are specifically designed to make your life easier.

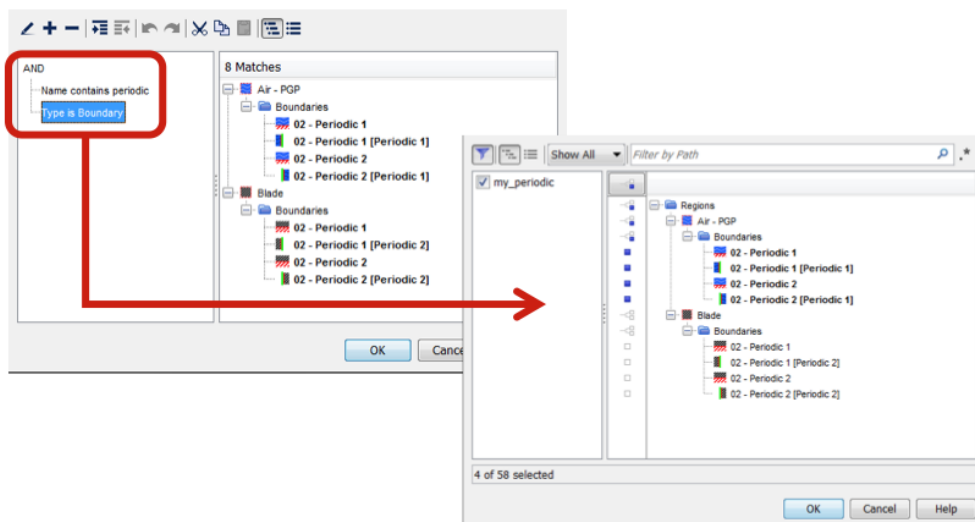
Take for example Field Functions. This feature, located under our Tools node, lets you construct customized expressions. It can be used to set up your physics (by specifying initial or boundary conditions) and to assess the quality of your solution (with monitors and reports). However, it?s not always straightforward to construct these formulas as they increase in complexity.



In the illustration above, we have an expression used to specify a toroidal initial condition for a volume fraction. To make editing easier, we?ve added parenthesis matching (displayed as a

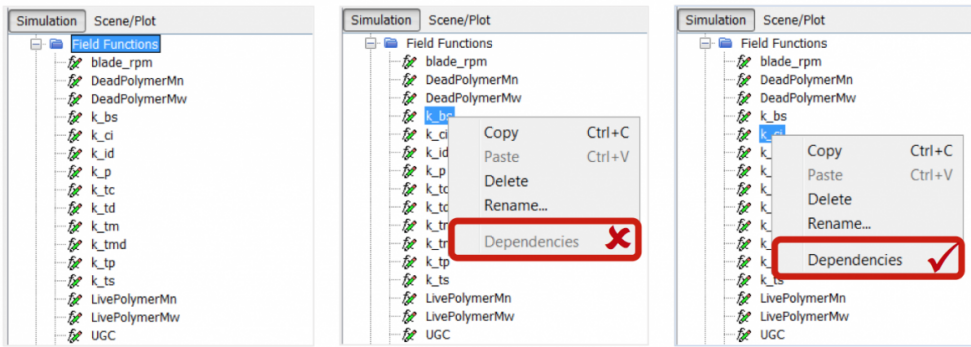
yellow highlight). Syntax highlighting provides you with immediate feedback on whether your expression is constructed correctly or not. Finally, a quick reference to all system functions provides the benefit of not having to search thru the documentation to find what you are looking for.

Another area where significant time can be saved is in finding and grouping things. To do this, we use Filtering, also located under our Tools node. The big change for this release is that Filtering is now capable of supporting queries. What this means is that you can use conditional expressions to group things. This is best illustrated with the example below:



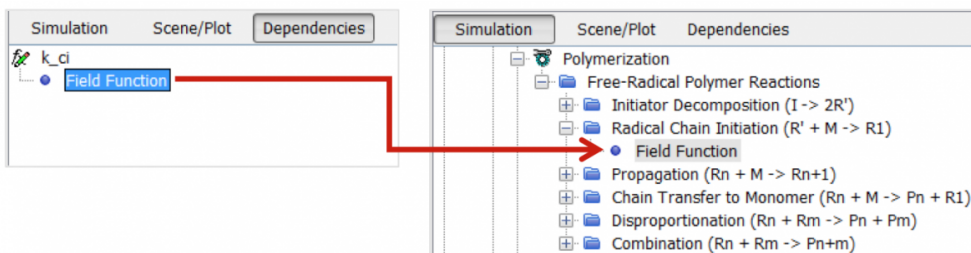
Let's say we want to create a scene containing all of our periodic surfaces. Unless we know (or remember) all the regions where they are located, it's easy to miss one. And finding them all previously meant hunting them down one-by-one. To save time and be confident that we've found them all, we can set up a query-based filter to first look for all things containing the name 'periodic'. From that list, we want to filter one more step to identify just the periodic boundaries. The output of that query is a group of objects that can be passed to a displayer for a scene. We are just starting to expose the powerful capabilities of query-based filtering. Looking slightly ahead past the 9.04 release, we will be dramatically expanding this feature to handle more complicated use cases.

When we are collaborating or trying to learn something new, we often need to review a .sim file that was put together by someone else. Let's consider the example of polymerization kinetics that is also being introduced with this release. To set up a polymerization simulation, individual reactions need to be associated with Field Functions. When we first look at our Field Functions, we're confronted with a long list (figure at left). To find out whether and where a function is being used, we right click on it. In the pulldown menu illustrations below, we can quickly determine that the reaction rate expression K_{bs} is not in use but the K_{ci} is.



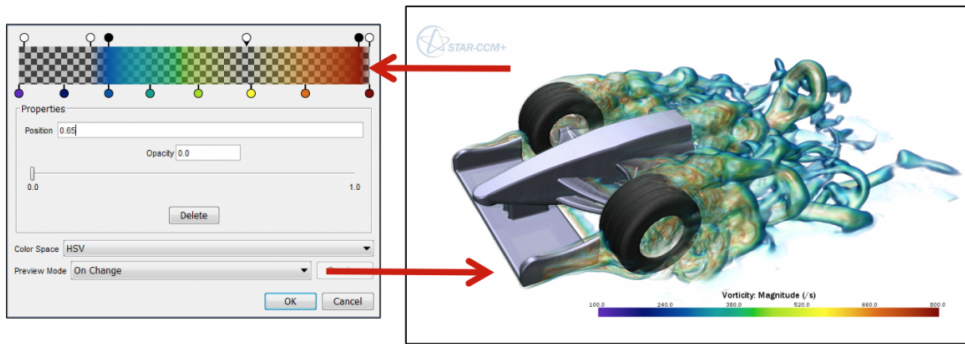
So, the next question now becomes ?Where is this being used?? By selecting ?Dependencies? we can see, in the new Dependencies Viewer, exactly where the reaction rate expression k_{ci} is been applied in our problem setup. I think we can appreciate that trying to find this dependency manually would have been a bit of a challenge.

Another particularly good use case for the dependency viewer is in identifying dependencies across reports, monitors and plots. If you've ever had the experience of trying to delete a monitor or report only to be confronted by the message that it is in use and can't be deleted, this feature helps tremendously. By following the dependency viewer for the report, you can navigate to either the plot or monitor that depends on it and decide whether to delete the object or not.



Lastly, you now have an interactive colormap editor that greatly simplifies the task of creating effective visualizations. Colormaps are fundamental to how we present and communicate our information. This feature lets you create, modify, copy/paste and import/export your own colormaps. Where this feature is particularly useful is when it is used in combination with volume rendering.

In the colormap editor below, control points can be used not only to change the color along the map (the control points on bottom), but also to change it's level of transparency (control points on top). To create this particular illustration, changes to transparency are made step-by-step. The resulting image is assessed and transparency control points are added and modified as needed. Changes can be previewed interactively, making it easy to quickly arrive at the desired end result.



While batch operation is a requirement for high productivity in CAE analysis, there is still a need for manual interaction. Checking the problem setup, quickly identifying changes from one simulation file to another, and critically assessing the results all require skill and judgment. We expect that these changes will increase your productivity and improve your overall experience in working.

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