



Published on *CD-adapco* (<http://www.cd-adapco.com>)

[Home](#) > STAR-CCM+ v9.02: Adjoint Tumble and Swirl

STAR-CCM+ v9.02: Adjoint Tumble and Swirl



Joel Davison

February 18, 2014, 3:09 pm

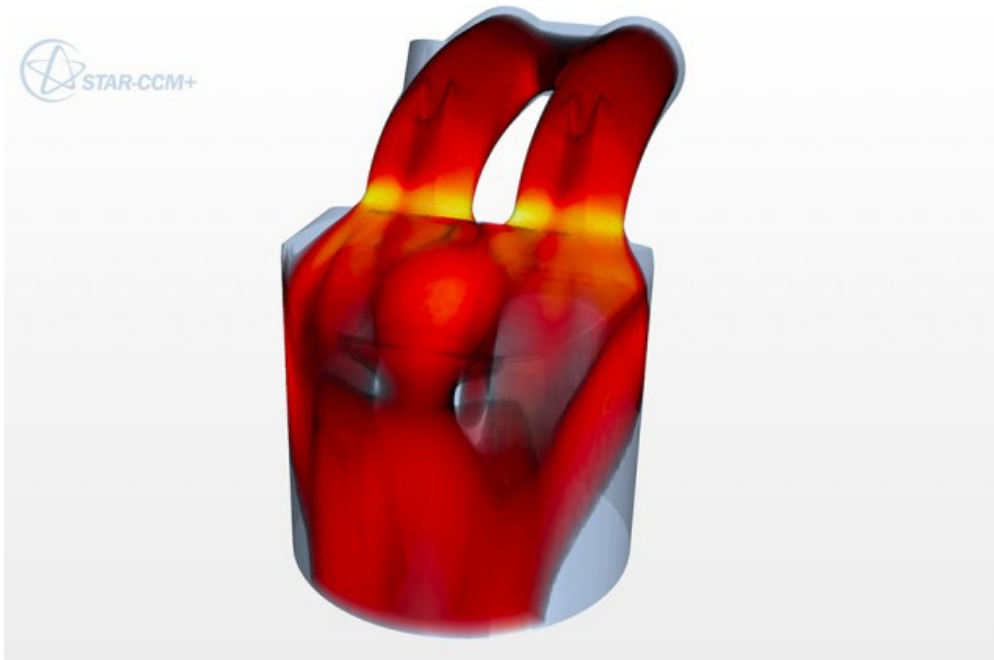
[Share This Post](#)

One of the greatest challenges of engineering analysis is the ability to understand how changes in geometry and flow features might influence your system's performance. For a long time, the only way to gain insight into the sensitivity of engineering objectives to changes in input was to run multiple analyses and then dig through the results. The introduction of the adjoint solver in STAR-CCM+ v8.04, however, changed that - allowing for direct access to sensitivity information from a single simulation.

In the upcoming version of STAR-CCM+, v9.02, we have a number of new features that broadens the applicability and improves the ease of use of the adjoint solver. Chief among these developments is the new tumble and swirl cost function - a feature implemented based on direct feedback from our industrial users. This cost function, targeted at the IC engine community, allows for sensitivities to be presented with respect to a key metric used in steady-state port flow analyses. In such studies, improving the tumble and swirl characteristics of the port is critical, so the additional insight that the adjoint solver brings will be of great benefit.

To improve ease of use, the adjoint cost functions have been migrated to STAR-CCM+'s standard reporting capability. This allows you to understand whether the cost functions you are interested in are returning sensible values before you run the adjoint solver itself. The reports themselves are available, regardless of whether you are interested in adjoint or not. This means all users can benefit from the new tumble & swirl report, as well as the addition of a pressure drop and uniformity deviation report.

STAR-CCM+'s adjoint solver has already come a long way since its first release just eight short months ago and the pace of development will continue. We believe it's a technology that can benefit all of our users and so we continue to be committed to its future development with a dedicated team improving and enhancing the tool. There are a lot of exciting new features coming with v9.02 and beyond. I hope you get a chance to try them out and let us



CD-adapco is the world's largest independent CFD focused provider of engineering simulation software, support and services. We have over 30 years of experience in delivering industrial strength engineering simulation.

Source URL: <http://www.cd-adapco.com/blog/joel-davison/star-ccm-v902-adjoint-tumble-and-swirl>