

Images as the input format for a Navier-Stokes solver

Navier-Stokes solvers are complicated programs. Using them properly requires knowledge and skills. Also, the user has to prepare the input to the solver, that is, first and foremost, the geometry of the boundaries of the flow. In many cases this task is done using additional specialised software.

What, however, if all one wants is just a movie of the flow, and all one has as an input is the picture of the body, the flow past which needs to be visualised? Flow Illustrator is the answer to this. Its first version, an online server, allows the user to upload the picture, adjust a few parameters if desired, and receive a movie of the flow past it. Figures 1, 2, and 3 illustrate the sequence. One can have, however, to wait in a queue... ☹️

A stand-alone version, an Interactive Flow Illustrator, works on the computer of the user, and shows the flow visualisation in real time on the screen rather than recording a movie. The Reynolds number and the movie speed can be adjusted on the go. Interactive Flow Illustrator is now (2011-2012) being developed under the Faculty of Engineering Enabled project. Its future versions will allow modifying the body shape during the calculation, and using a video camera as a source of the input image in real time. Interactive Flow Illustrator is being developed for educational purposes: imagine a lecturer explaining flow separation while demonstrating the separated flow past his or her own hand. In the future the technology of using images as the input format might find other applications.

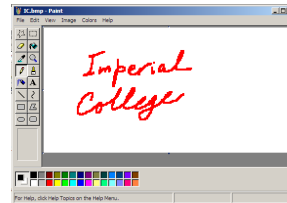


Fig.1 Draw a picture in Paint and save it.



Fig.3 Save the file with the movie, and watch it.

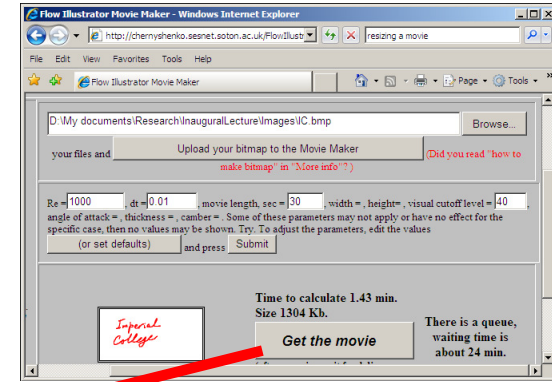


Fig.2 Browse to the picture file and press the 'Upload' button. Adjust the parameters and press 'Get the movie'.

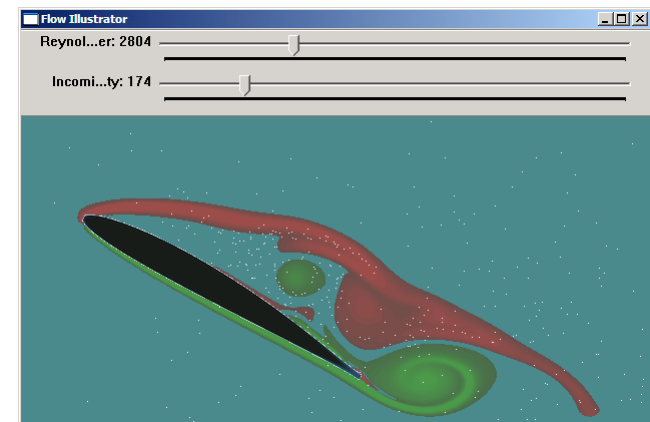


Fig.4 Stand-alone version. Just run the code on your computer. Select the image, or draw it. Watch the flow on your screen, adjusting parameters as needed.

More information:

Google for

Flow Illustrator

Want to help to test the latest version? Talk to Prof. S.I. Chernyshenko