### STEFANI CHRYSOSTOMOU

#### PERSONAL INQUIRY

# "THE SIMULATION OF FLUIDS WITH HIGH VISCOSITY" MADE 2016/17

## **Key References:**

Jie, TAN, and YANG Xubo†. *Physically-Based Fluid Animation: A Survey*. China: SCIENCE IN CHINA PRESS, 2008. Web. 24 May 2017.

Tan Jie and Yang Xubo are members of the Department of Computer Science at Shanghai Jiao Tong University. Their paper "Physically-based Fluid Animation" gives an informative overview of the different physically based fluid methods, such as Lagrangian, Eulerian and Lattice Boltzmann. Furthermore, they analyse different fluid types including viscous fluids.

Seymour, Mike. "The Science Of Fluid Sims". (2011): n. pag. Web. 24 May 2017.

Mike Seymour is an award winning Film producer. His article "The science of Fluid Sims" briefly explains the importance of fluid simulations in Visual Effects. The article includes a helpful explanation of the Navier Stokes Equations and the different approaches to simulating fluids including FLIP and Naiad which he believes is efficient in simulating viscous fluids.

M. Cimbala, Professor John. "Fluid Mechanics Learning Modules". *Mne.psu.edu*. Web. 24 May 2017.

Fluid Mechanics Learning Modules has been created by Professor John M. Cimbala from Penn State University. The modules include a helpful introduction to fluid mechanics, the different methods of fluid visualisation and similar concepts.

### References

- N.p., 2011. Web. 24 May 2017.
- Braley, Colin, Adrian Sandu<sup>†</sup>, and Virginia Tech. *Fluid Simulation For Computer Graphics: A Tutorial In Grid Based And Particle Based Methods*. 1st ed. Web. 24 May 2017.
- Coletto, Federico. 1st ed. 2003. Web. 24 May 2017.
- *Derivation Of Governing Equations*. 1st ed. 2017. Web. 24 May 2017.
- Elert, Glen. "Viscosity The Physics Hypertextbook". *Physics.info*. N.p., 2017. Web. 24 May 2017.
- Fan, Ye et al. *Eulerian-On-Lagrangian Simulation*. 1st ed. Web. 24 May 2017.
- Foster, Dave. Fluid Dynamics. 1st ed. 2017. Web. 24 May 2017.
- Goktekin, Tolga Gokce. *Animating Viscoelastic Fluids*. 1st ed. 2011. Web. 24 May 2017.
- Rude, Ulrich. Stable Free Surface Flows With Lattice Boltzmann Method On Adaptively Coarsended Grids. 1st ed. 2008. Web. 24 May 2017.
- Sharma, Vishu. "What Is The Difference Between Lagrangian And Eulerian Approach?". N.p., 2017. Web. 24 May 2017.
- The Sci Guys: Science At Home SE2 EP7: Viscosity Of Liquids. 2014. Web. 24 May 2017.
- Tickner, Glenn, and Alvin H. Sacks. *Engineering Simulation Of The Viscous Behavior Of Whole Blood Using Suspensions Of Flexible Particles*. 1st ed. Web. 24 May 2017.
- van Biezen, Michel. *Physics Fluid Dynamics (1 Of 25) Viscosity & Fluid Flow: Introduction*. 2014. Web. 24 May 2017.

"Viscosity". Sidefx.com. N.p., 2017. Web. 24 May 2017.

Wang, Huamin, Peter J. Mucha, and Greg Turk. 1st ed. Web. 24 May 2017.

"What Are The Navier-Stokes Equations?". *Comsol.com*. Web. 24 May 2017.

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