Derivation of Boltzmann-type equations for high-speed flows

Classical models of fluid dynamics can be expressed in terms of evolution equations for the probability distribution functions for finding, at certain time, particles located in a certain spatial position. The correct physical framework is offered by the Boltzmann equation and it is usually resolved computationally, using suitable numerical approximation schemes – the so-called lattice Boltzmann methods.

The main task is to derive Boltzmann-type equations able to approximate fluid flows at high speeds.

It is of particular interest to see how the approximating errors depend on the size of the Mach number.

The person responsible for the problem is Prof. Per Weinerfelt at Saab Aeronautics/LiU in Linköping. (per.weinerfelt@saabgroup.com)