On the Role of Tracking on Eulerian-Lagrangian Solutions of the Transport Equation.

Anabela Oliveira and António M. Baptista

Summary

We investigate the effect of tracking errors on the accuracy and stability of Eulerian-Lagrangian methods (ELMs) for the solution of the transport equation. A combination of formal analysis and numerical experimentation demonstrates that the effect is severe. Even moderate tracking errors substantially affect the preservation of the zeroth, first and second moments of concentration (mass, phase and diffusion) and may lead to the instability of otherwise stable and very accurate ELMs. The use of accurate tracking algorithms is strongly recommended for Eulerian-Lagrangian simulations involving complex flows.

Key Words: Transport equation. Eulerian-Lagrangian methods. Tracking methods. Mass conservation. Numerical experimentation. Accuracy analysis. Stability analysis.

Email to: Oliveira, Baptista.
Return to: Anabela Oliveira.