

Performance modeling and optimization of a Lagrange-Remap algorithm on multicore processors

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ABSTRACT

Performance modeling aims at building simple analytical models which allow to predict the performance of an algorithm on a target computing architecture from the knowledge of the main features of both the algorithm and the processor.

Such models provide a deep understanding of the performance of an algorithm and help to identify suitable optimization strategies. Performance models are robust and stable tools, since they are derived from algorithm study and are not based on one of its specific implementation. They can also be seen as decision-making tools.

We will present recent results of the performance study of a reference staggered Lagrange-Remap algorithm for compressible gas dynamics obtained using *Roofline* and *ECM* models. As a result, we are able to predict the whole performance on modern processors with errors of order 5%, which is very accurate.

Moreover, as a consequence, the analysis also gave us highlights for designing a new Lagrange-Remap-like solver with expected better performance. In particular, using low diffusive interface capturing methods rather than interface tracking strategies appears to be promising because of their SIMD features. This will be address in the companion talk by De Vuyst et al. in this workshop.

References

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