An hybrid computing implementation for remeshed particle method with operator splitting.

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SUMMARY

The talk will be devoted to the numerical tool *HySoP* [1] which a Python library dedicated to high performance numerical approximation of fluid-related problems solutions based on semi-Lagrangian particle methods, known as Remeshed Particle Method (RPM) and operator splitting.

The idea behind the proposed numerical method is to benefit from operator splitting such that each sub-operator can be solved by using a dedicated solver based on the most appropriate numerical scheme and by employing a space discretization that is regular enough to be handled by accelerators (GPUs).

In this talk we will cover some of the major design choices made through years of development mainly in Python regarding software engineering, parallelism, hybrid computing (CPU+Accelerators) and code optimisations.

The talk will end with some illustrations of successful usages in both terms of applications and performances [2, 3, 4].

Keywords: High performance computing, Remeshed particle methods, GPU

AMS Classification: 65M22,68W15

References

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