

Formura: Programming Language for High-performance Structured Lattice Stencil Computation

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Recently, programming and performance optimization have become a big burden in simulation science. In studies of planetary formation and evolution, many applications can be reduced to explicitly solving some partial differential equations (PDEs). We have been developing Formura, a programming language for stencil computations, that can generate explicit solver codes for PDEs. In formura, we can describe discretized PDE-solving algorithms using convenient and familiar mathematical notations such as functions, discretized differentiation operators, rational lattice indices such as half-grid coordinates. We will report the current development status, sample codes, and performance measure of formura.

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