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Notes on Amorphous Computing

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ABSTRACT

An amorphous computer is a multitude of small/tiny computers each with a CPU, memory and communication means. Physically these computers are similar to sand particles and they occupy a finite compact domain *D* in one, two, or three dimensional Euclidean space, depending on the application.

This note presents a computational model for an amorphous computer and explores its use for numerical computing, in particular, for the simulation of partial differential equations.

Integration formulas for partial differential equations of systems that satisfy conservation laws are derived. It is shown that, under appropriate conditions, the formulas provide consistent and stable and, therefore, convergent approximations to the problems on hand. In other words, one can perform integration of PDEs using the amorphous computer.

The communication between the computers is investigated and it is shown that starting with asynchronous communication one can derive necessary information needed to switch over to synchronous communication.