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Fluid Dynamics on Logarithmic Lattices

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A great challenge in numerical simulations of geophysical systems (such as in climate models) is the important range of relevant scales. In particular in fluid dynamics, it is impossible to do Direct Numerical Simulations of the whole system, and one has to resort to a variety of numerical tricks.

We present a new method, “Logarithmic Lattices”, which aims at simulating very important ranges of scales with minimal numerical footprint. In our presentation we focus on the motivation behind this model, the details of the model, a small concrete use case, and future developments.

This method is totally new from a theoretical point of view; as it significantly reduces the memory, computation and storage impact of our numerical simulations, we believe it to be of great interest outside the field of turbulence, since its core principles can easily be generalized.

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