Numerical methods for studying transition probabilities in stochastic ocean-climate models

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Propositions

accompanying the thesis

Numerical methods for studying transition probabilities in stochastic ocean-climate models

by Sven Baars

1. Using a multilevel approach for solving linear systems can reduce both the memory requirements and computational time.
2. Skew partitioning does not only resolve issues with isolated pressure nodes in Arakawa C-grid discretizations of the Navier–Stokes equations, but also reduces communication.
3. Unlike other methods for solving Lyapunov equations, RAILS can easily be restarted, and therefore the required amount of memory is reduced.
4. Because RAILS can recycle solutions of similar Lyapunov equations, it is very well suited for solving extended Lyapunov equations and for solving Lyapunov equations during a continuation.
5. Trajectory-Adaptive Multilevel Sampling is the method of choice when it comes to computing transition probabilities.
6. The main issue with using adaptive multilevel splitting methods for high-dimensional problems is the memory demands. This can be resolved by using a projected time stepping approach.
7. The hard part of parallel computing is not designing parallel algorithms, but finding a supercomputer that works as it should.
8. Trembling does not necessarily imply nervousness.