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Propositions

1. The code generation tool CtADEL is able to generate efficient code for finite element methods (Chapter 2); and is able to generate parallel or CUDA program (Chapters 4 and 6).

2. The performance of the parallel implementation of the HIRLAM weather forecast model can be significantly improved by overlapping communications with calculations (Chapter 3).

3. Using GPUs for weather forecasting yields an order of magnitude performance improvement over the use of conventional CPUs (Chapter 5).

4. Together with theory and experimentation, computational science now constitutes the “third pillar” of scientific inquiry, enabling researchers to build and test models of complex phenomena (Report to the President, Computational Science: Ensuring America’s Competitiveness, USA, June 2005).

5. Computers are incredibly fast, accurate, and stupid; humans are incredibly slow, inaccurate and brilliant; together they are powerful beyond imagination (Albert Einstein).

6. In computational science the implementation of the problem is just the first step, analyzing the results is much more important.

7. The power of GPUs may threaten the security of using password.

8. Do not try to debug a program late afternoon in the office, because most likely you will find the solution on the way back home.

9. Life will become very complicated if it has UNDO functions.

10. A 4 year old child thinks that a newborn baby is a doll toy. Do not let them play together without supervision.