Direct Numerical Simulation of Detonation

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The last decade has been witness to a thousand fold gain in computational power, in addition to comparable gains from improved computational algorithms such as adaptive mesh refinement algorithms. But, even with these gains, there are many detonation phenomena which are beyond the current and foreseeable capabilities of simulation. Some of the key issues are 1) lack of high rates of convergence for shock capturing schemes 2) Multi-scale nature of detonation and 3) Poorly posed mathematical models. An overview of accomplishments in the field, current state of the art, and future work on detonation simulation will be discussed.