



复旦大学数学科学学院 数学综合报告会

报告题目: **Preconditioned Steepest Descent (PSD) solver for regularized p -Laplacian equations**

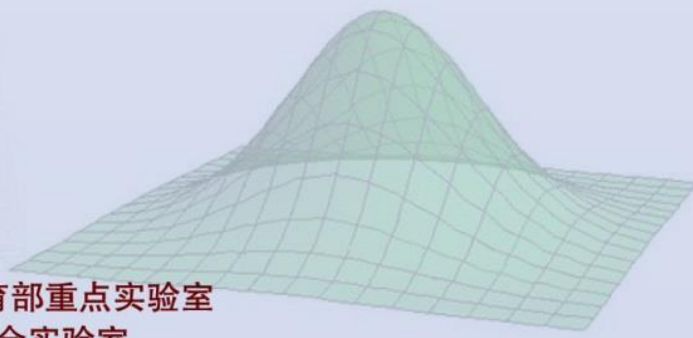
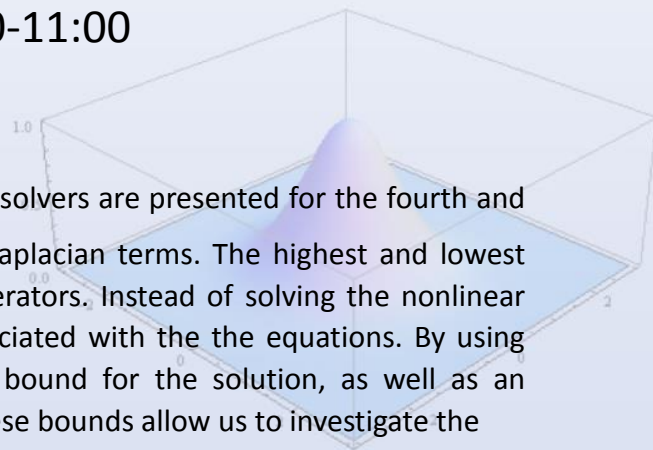
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报告时间: 2017年1月12日 10:00-11:00

报告地点: 光华东主楼 1801

摘要: A few preconditioned steepest descent (PSD) solvers are presented for the fourth and sixth-order nonlinear elliptic equations that include p -Laplacian terms. The highest and lowest order terms are constant-coefficient, positive linear operators. Instead of solving the nonlinear systems directly, we minimize the convex energies associated with the equations. By using the energy dissipation property, we derive a discrete bound for the solution, as well as an upper-bound for the second derivative of the energy. These bounds allow us to investigate the convergence properties of our method. In particular, a geometric convergence rate is shown for the nonlinear PSD iteration applied to the regularized equation, which provides a much sharper theoretical result over the existing works. Some numerical simulation results are also presented in the talk, such as the thin film epitaxy with both $p=4$ and $p=6$, as well as the gradient flow of the squared phase field crystal (SPFC) model.



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