



## 复旦大学数学科学学院 数学综合报告会

报告题目: **Some techniques in the nonlinear numerical analysis**

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报告时间: 2018-01-17 星期三 10:00-11:00

报告地点: 光华东主楼 1801

**摘要:** The theoretical issue of numerical stability and convergence analysis for a wide class of nonlinear PDEs is discussed in this talk. For most standard numerical schemes to certain nonlinear PDEs, such as the semi-implicit schemes for the viscous Burgers' equation, a linearized stability analysis, based on an a-priori assumption for the numerical solution, has to be performed to make the local in time stability and convergence analysis go through. In this case, such a numerical stability is conditional. Instead, if the a-priori assumption bound for the numerical solution is associated with the same functional norm as the convergence estimate norm, the linearized stability becomes unconditional, for a fixed final time. Meanwhile, if an implicit treatment is applied to certain nonlinear terms involved with singularity, such as logarithmic terms, two levels of estimates have to be undertaken to pass through the optimal rate convergence analysis: a preliminary error estimate is expected to yield a desired bound estimate between the numerical solution and the limit values, while a refined error estimate would give an optimal rate analysis. A few examples of these cases will be presented and analyzed in the talk.

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