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Qingshan Chen* (qinchen@indiana.edu), Department of Mathematics, Rawles Hall, Bloomington, IN 47403, and **Roger Temam**. *Accurate resolution of a nonlinear PDE with corner singularities*. Preliminary report.

For the solution of an initial-boundary value problem to be smooth near the origin, it is necessary and sufficient that the initial conditions and the boundary conditions satisfy some compatibility conditions, in general, if the solution exists. The number of necessary compatibility conditions depends on the desired regularity (up to infinitely many conditions). When these compatibility conditions are not satisfied, corner singularities will occur in the solution near $t = 0$, which may cause a severe loss of numerical accuracy. In this talk we will present a remedy procedure valid in principle for general equations, but for clarity we will restrict ourselves to the viscous Burger's equation, and we will show how to numerically handle the first two and most important singularities and thus improve the numerical accuracy. This is a joint work with Roger Temam. (Received September 16, 2008)