1143-65-150 **Tong Sun*** (tsun@bgsu.edu), 6841 Reflections Dr., Maumee, OH 43537. *Numerical smoothness and error analysis for numerical solutions of parabolic PDEs.*

In the past work on numerical PDEs, it is found that certain smoothness properties of numerical solutions (numerical smoothness) are necessary for optimal rate convergence. Moreover, for nonlinear hyperbolic conservation laws, numerical smoothness has been used to obtain error estimates which are optimal in terms of convergence rate, and also optimal in error propagation. The dual optimality in this sense is the key to make an error estimate practically useful. This talk is to show some progresses of using numerical smoothness toward the error analysis for finite element solutions of parabolic problems. (Received August 07, 2018)