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**Sarma Chandramouli\*** ([chsarma@math.sunysb.edu](mailto:chsarma@math.sunysb.edu)), Dept of Mathematics, State University of New York at Stony Brook, Stony Brook, NY 11790-3651. *Renormalization of  $C^2$  and  $C^{1+Lip}$  unimodal maps*. Preliminary report.

It is known that the hyperbolic renormalization picture extends from the setting of holomorphic maps to the space of  $C^{2+\alpha}$  unimodal maps, for  $\alpha$  close to one. In this talk, we discuss what happens when one approaches from below the minimal smoothness thresholds for the uniqueness and for the hyperbolicity of the period doubling renormalization fixed point.

Our main result states that, in the space of  $C^2$  unimodal maps the analytic fixed point is not hyperbolic and that the same remains true when adding enough smoothness to get a priori bounds. In this smoother class, denoted by  $C^{2+|\cdot|}$ , the failure of hyperbolicity is tamer than in  $C^2$ . Things get much worse with the smoothness less than  $C^2$ , as then even the uniqueness is lost and other asymptotic behavior becomes possible. We show that the period doubling renormalization operator acting on the space of  $C^{1+Lip}$  unimodal maps has infinite topological entropy. (Received January 31, 2008)