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**Chao Zhu\*** ([chao@math.wayne.edu](mailto:chao@math.wayne.edu)), Department of Mathematics, Wayne State University, 656 W. Kirby St., Detroit, MI 48202, and **George Yin** ([gyin@math.wayne.edu](mailto:gyin@math.wayne.edu)) and **Q. S. Song** ([song@math.wayne.edu](mailto:song@math.wayne.edu)). *On Stability of a Class of Nonsmooth Dynamic Systems.*

This work is devoted to the stability of a class of nonsmooth dynamic systems that are systems of differential equations modulated by a random switching process. The dynamic systems of interest have both continuous component representing continuous dynamics and discrete component representing discrete events. After giving the precise formulation of the nonsmooth dynamic systems with random switching, we recall the notion of stability and provide sufficient conditions in terms of Liapunov functions. Our main results include easily verifiable conditions for stability and instability of systems arising in approximations. With the aid of a logarithm transformation, we further derive necessary and sufficient conditions for stability for dynamic systems that are linear in the continuous component. Several examples of nonsmooth phase portraits are provided as demonstrations. It should be noted that somewhat different behavior than the well-know Hartman-Grodman theorem is observed. (Received July 28, 2006)