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Shaobai Kan* (skan@jjay.cuny.edu), 445 W. 59th Street, Room 4226N, New York, NY 10019,
and **George Yin**. *Identification of Regime-Switching Systems with Structural Uncertainties*.

This work develops persistent identification of regime-switching systems that are subject to not only measurement noise, but also structural uncertainties such as unmodeled dynamics, sensor nonlinear mismatch, and observation bias. We consider two classes of problems. In the first class, the switching parameters are stochastic processes modeled by irreducible and aperiodic Markov chains with transition rates much faster than adaptation rates of the identification algorithms. Instead of tracking real-time parameters by output observations, we are devoted to investigating the average behavior of the parameter process. Identification error bounds are established and analyzed for their dependence on these structural uncertainties. In the second class of problems the parameters systems vary infrequently. An adaptive algorithm with variable step sizes is introduced for tracking the time-varying parameters. Numerical results are presented to illustrate the performance of the algorithm. (Received September 17, 2010)