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**Thomas G. Kurtz** and **Richard H. Stockbridge\*** (stockbri@uwm.edu). *Linear Programming Formulations of Singular Stochastic Control Problems.*

Many stochastic models include control actions which take effect instantly, for example, reflection at a boundary or instantaneous jumps to new locations. These types of actions are singular with respect to Lebesgue measure of time. This talk will develop equivalent linear programming formulations of singular control; the dynamics also allow absolutely continuous controls to be present. A key to the equivalence is the definition of relaxed controls for the absolutely continuous controls, but more importantly for the singular controls as well. The reformulation depends on characterizing the expected stochastic behavior of the states and controls through appropriate expected occupation measures that satisfy particular adjoint equations corresponding to the cost criterion. These characterizations in terms of expected behavior are nevertheless rich enough to capture the full stochasticity of the processes through existence of relaxed solutions to the singular martingale problem. A consequence of these existence results is the equivalence of infinite-dimensional linear programming formulations for the stochastic problems. Under appropriate conditions, the existence of optimal measures and corresponding optimal controls in feedback form are obtained. (Received January 13, 2015)