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Yipeng Yang* (yangy@uhc1.edu). *Finite Horizon Time Inhomogeneous Singular Control Problem of One-dimensional Diffusion via Dynkin Game.*

The Hamilton-Jacobi-Bellman equation (HJB) associated with the time inhomogeneous singular control problem is a parabolic partial differential equation, and the existence of a classical solution is usually difficult to prove. In this paper, a finite horizon stochastic singular control problem of one dimensional diffusion is solved via a time inhomogeneous zero-sum game (Dynkin game). The regularity of the value function of the Dynkin game is investigated, and its integrated form coincides with the value function of the singular control problem. We provide conditions under which a classical solution to the associated HJB equation exists, thus the usual viscosity solution approach is avoided. We also show that the optimal control policy is to reflect the diffusion between two time inhomogeneous boundaries. For a general terminal cost function, we showed that the optimal control involves a possible impulse at maturity. (Received September 16, 2014)