A PROBABILISTIC COMPARISON PRINCIPLE IN OPTIMAL STOPPING OF MARKOV PROCESSES, WITH APPLICATIONS TO VISCOSITY SOLUTIONS

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ABSTRACT. We present some results in optimal stopping and control of Markov processes with jumps. Using optimal stopping as the main example, we review the method of dynamic programming principle and viscosity solutions theory for the related Hamilton-Jacobi-Bellman equations. After recalling the basic ideas, we turn our attention to some problems in proofs of uniqueness, and more generally comparison principles. Finally, we outline a connection between viscosity solutions and potential theory of Markov processes. Motivated by the Dynkin characterization of the value function of an optimal stopping problem, we recognize classes of super- and subharmonic functions that satisfy a comparison principle. We conjecture that these classes coinside with the viscosity super- and subsolutions of the corresponding Hamilton-Jacobi-Bellman equation, which would provide a probabilistic proof of uniqueness for viscosity solutions.

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Date: May 2, 2007.