BELLMAN'S INCLUSIONS AND EXCESSIVE MEASURES

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Abstract: The paper is concerned with Bellman's inclusions for the value function of the optimal stopping for a Markov process X on a complete separable metric space E. The author investigates a connection between seemingly unrelated objects: excessive measures, differential inclusions and optimal stopping. Conditions are given under which an evolutionary Bellman inclusion has a strong or weak solution in the Hilbert space $L^2(E, \mu)$, where μ is an excessive measure for X. The solution is identified with the value function of a stopping problem. The stationary Bellman inclusion is treated as well. Specific examples of diffusions with jumps and infinite-dimensional diffusions are discussed. Excessivity of the measure μ plays an essential role in the development. The results are then applied to pricing American options both in finite and infinite dimensions recently investigated by Zhang [32], Mastroeni and Matzeu [20], [21], and Gątarek and Musiela [11].

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