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Rohit Jain* (rohitjain19@gmail.com). *Regularity Estimates for the Stochastic Impulse Control Problem.*

Stochastic impulse control problems are control problems that fall between classical diffusion control and optimal stopping problems. In these problems the controller is allowed to instantaneously move the state process by a certain amount every time the state exits the non-intervention region. This allows for the controlled process to have sample paths with jumps. There is an enormous literature studying stochastic impulse control models and many of these models have found a wide range of applications in electrical engineering, mechanical engineering, quantum engineering, robotics, image processing, and mathematical finance. Our aim is to study the resulting free boundary problem and consider regularity estimates for the solution and the free boundary of a fully nonlinear generalization of the problem. The free boundary we study is an obstacle-type problem admitting a non-local obstacle. (Received August 29, 2016)