

Master degree project in Mathematical Statistics

# Optimal stopping and stochastic control as applications of stochastic differential equations

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Suppose we can decide when to stop a stochastic process and that we want to do so according to some optimality criterion. We then face an optimal stopping problem. Now suppose that we instead can control, to some extent, the evolution of a stochastic process and that we want to do this according to an optimality criterion. We then face a stochastic control problem. Stochastic control and stopping theory has proven to be extremely useful for modeling dynamic decision making over time in random environments with applications in e.g., biology, engineering, and mathematical economics/finance.

The theory of optimal stopping and stochastic control can be developed as an application of the theory of stochastic differential equations. In present project we are interested such applications related to for example:

- Financial derivative pricing, optimal investment decisions, and other topics within mathematical finance
- Game theory problems

The present project is likely be most suitable for those who have taken the course **Brownian motion and stochastic differential equations, MT7043**, or another similar course. If you are interested, then let me know, and we can discuss details regarding a possible project.