

A TIME-DOMAIN PREDICTION PROBLEM FOR BROWNIAN MOTION WITH DRIFT

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ABSTRACT. Optimal prediction problems are a type of optimal stopping problem which try to predict the future. They attempt to answer such questions as “When should I sell the stock” or “Which team should I bet on” and hold the promise of exciting applications in many areas of science. We will consider the prediction problem of finding the closest stopping time τ to the time θ at which Brownian motion with drift attains its ultimate maximum over the interval $[0, 1]$. The problem turns out to have a remarkable internal structure which has surprising and unexpected consequences for Lévy processes and a certain broader class of Markov processes. We will expose this internal structure and present the solution to the prediction problem.

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