

Lévy Processes and Optimal Stopping

We start with the classical secretary problem, where our aim is to choose the best candidate out of a number of applicants appearing in front of us in a random order, without having the option of going back to a previously rejected applicant. This example of an optimal stopping problem has been well studied (and still is!), and it will illustrate in a rather simple setting some important features of optimal stopping problems. We will then move our attention to Lévy processes, which form a surprisingly rich class and for example include Brownian motion and (compound) Poisson processes. In recent years they have found many financial applications, one of which is the study of so-called American options.

Prior knowledge of Lévy processes is not required for this minicourse as we will discuss (and derive) some of their main properties. We study in detail a couple of well-known optimal stopping problems, such as the American put and an optimal prediction problem, where the aim is to approximate optimally the time at which a Lévy process attains its maximal value. By studying these examples, we will also be focusing on some important concepts from the general theory of optimal stopping.