

A singular differential equation for the value function of an optimal problem of a speculator

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In this paper we investigate optimal harvesting of a renewable natural resource. While in the standard approach the resource is located at a single point in space we allow for the resource to be distributed over the plane. Consequently, an agent who exploits the resource has to travel from one location to another. For a fixed planning horizon we investigate the speed and the time path of harvesting chosen by the agent. We show that the agent adjusts the speed of movement so that he accomplishes to visit each location only once, even in the absence of travelling cost. Since he does not come back to any location for a second harvest, it is optimal for him to fully deplete the resource upon arrival. A society interested in conserving some of the resource thus has to take measures suitable to limit the exploitative behaviour of the agent.