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fd_limdisc

1 Introduction

A barrier option is activated or extinguished when a specified asset price, index, or rates reaches a specified level. Some models of barrier option assume continuous monitoring of the barrier, others specify fixed times for monitoring of the barrier. The price at time t of an European Call-Down Out option with discret monitoring is solution of the following PDE :

$$\begin{cases} \frac{\partial V}{\partial t} + \frac{\sigma^2 S^2}{2}\frac{\partial^2 V}{\partial S^2} + rS\frac{\partial V}{\partial S} - rV = 0, \\ V(S,T) = (S-K)_+ 1_{l,\infty}(S). \end{cases}$$

with updating of the initial condition at the monitoring dates $0 = t_0 < t_1 < \cdots < t_N = T$

$$V(S,t_i^-) = V(S,t_i)1_{l,\infty}(S)$$

for $i = 1,..,n$.
The PDE is solved with standard finite difference method, taking opportunely in account the jump conditions at monitoring dates t_i.

References