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fd_fvexpl

Input parameters:

- SpaceStepNumber N

Output parameters:

- Price
- Delta1
- Delta2

See Explicit Finite Volume.

/*Logarithmic Transformation*/
Standard logarithmic transformation $(X_t^1, X_t^2) = (log(S_t^1), log(S_t^2))$.

/*Memory Allocation*/

/*Constants*/

/*Space localization/*
Define the integration domain $[u1 - loc, u1 + loc] \times [u2 - loc, u2 + loc]$ using probabilistic estimation.

/*Rotation*/
Eliminate the partial derivative term $\frac{\partial}{\partial x_1 \partial x_2}$ in the second order operator.

/*homothetie*/
Transform the second partial derivatives into a Laplacien.

/*Space Step/*
Define the space step $h = \frac{2loc}{N}$ and $g = \frac{2b3loc}{N}$.

/*Localization after rotation and homothetie*/
Define the geometrical transformation of $(u1, u2)$.

/*Stability Condition*/
Define a L^∞ stability conditions.

/*Pechlet Condition*/
If the Pechlet condition isn't checked, one uses a upwind scheme.

/*Upwind Scheme*/

/*Stability Condition Time Step*/
This the stability condition for the upwind scheme.

/*Constants*/
Using for the upwind explicit finite difference cycle.

/*Central Scheme*/
If the Pechlet condition is checked, one uses a central scheme.

/*Stability Condition Time Step*/
This the stability condition for the central scheme.

/*Constants*/
Using for the central explicit finite difference cycle.

/*Initial Conditions*/
The maturity conditions give initial conditions when we set $t' = T - t$.

/*Explicit Finite Difference Cycle*/
At any time step, we compute the explicit scheme.

/*Homogeneous Dirichlet Conditions*/
Condition for the boundary values.

/*Splitting for American case*/
For Americain options, we compare at each time step the solution in u with the payoff ψ. We save the result in uap.

/*Price*/

/*Delta*/

/*Memory Desallocation*/