

fd_gmres

Input parameters:

- SpaceStepNumber N
- TimeStepNumber M
- Max Iter max_iter
- Tol tol
- Restart Number tol
- Preconditioner $precond$

Output parameters:

- Price
- Delta1
- Delta2

/*Compress Diagonal Storage*/

/*Dirichlet Boundary Conditions*/

/*Memory Allocation*/

/*Space localisation*/

Define the integration domain $D = [-l, l]^2$ using probabilistic estimation.

/*Space Step/*

Define the space step $h = \frac{2l}{M}$.

/*Time Step/*

/*Cds format/*

/*Preconditioners/*

Diagonal or ILU Preconditioners.

/*Terminal Values/*

Put the value of the payoff into a vector P

/*Homegenous Dirichlet Conditions/*

/*Finite difference Cycle/*

At any time step, described by the loop in the variable *TimeIndex*, we have to solve the linear system with GMRES Algorithm (cf. [there](#))

/*Gmres Algorithm/*

/*Splitting for American case*/

For American options, we compare at each time step the solution in P with the payoff function saved in *iv*. We save the result in P

/*Price*/

/*Delta*/

/*Memory Desallocation*/