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fd_brennanschwartz

Input parameters:

- SpaceStepNumber N
- TimeStepNumber M

Output parameters:

- Price
- Delta

/*Time Step/*

Define the time step $k = \frac{T}{N}$.

/*Space localisation/*

Define the integration domain $D = [-l, l]$ using inequality [there](#).

/*Space Step/*

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

At each time, we have to solve the linear complementarity problem cf. [there](#)

/*Peclet Condition*/

If $|r - \delta| / \sigma^2$ is not small, then a more stable finite difference approximation is used. [there](#).

/*Neumann Boundary Conditions/*

/*Lhs factor of implicit scheme/*

Initialize the matrix M issued from the totally implicit method in the cases of Neumann Boundary conditions. [there](#)

/*Gauss algorithm/*

This procedure transforms the tridiagonal matrix M in the lower triangular matrix \tilde{M}

/*Terminal value/*

Put the value of the payoff saved in $Obst$ into a vector P which will be used to save the option value.

/*Finite difference Cycle/*

At any time step, described by the loop in the variable $TimeIndex$, we have to solve the linear complementarity problem cf. [there](#)

/*First Loop/*

Compute the right hand side \tilde{G} of the linear complementarity problem cf. [there](#) and save it in P .

/*Second Loop/*

Solve the algorithm cf. [there](#) and save the option value in P .

/*Price*/

/*Delta*/

/*Memory Desallocation*/