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tr_bbsr

Input parameters:

- StepNumber N

Output parameters:

- Price
- Delta

This is taken from [2] The ideas of this algorithm is to replace the last time step of the binomial tree by the Black-Scholes formula. This will smooth the terminal payoff so that one may hope an enhanced convergence. This may be called BBS(Binomial Black-Sholes) algorithm. The additional feature of this algorithm is to perform a Richardson extrapolation, whence the name BBSR.

*/*Memory Allocation: Price, Intrinsic Value arrays*/*

*/*Up and Down factors*/*

*/*Risk-Neutral Probability*/*

This is Hull-White binomial probability for which the local consistency condition is easily checked (cf. [1])

*/*Intrinsic Value computation*/*

Storage of the $2N + 1$ possible values of the intrinsic value.

*/*Backward Resolution*/*

Note that we don't re-compute the intrinsic value.

*/*LastTime Step*/*

The continuation value is done by Black-Scholes formula.

/*Delta*/

The delta here is the right hedging delta in the binomial model (cf [The Generalized CRR model](#)). There may be a more clever way to approximate the continuous-time Black&Scholes delta.

/*First time step*/

/*Price*/

/*Desallocation*/

References

- [1] J.HULL A.WHITE. The use of the control variate technique in option pricing. *J.Of Finance and Quantitative Analysis*, 23:237–251, 1988. 1
- [2] M.BROADIE J.DETEMPLE. American option valuation : new bounds, approximations and a comparison of existing methods. *Review of financial studies, to appear*, 1995. 1