ap_fixedasian_thompsonlow

Output parameters:

- Price
- Delta

Description: Fixed Asian options are priced with Thompson lower bound[1]. The same lower bound as in Rogers-Shi[2] is given, but it is easier to compute.
/*This is the integrand in the formula 3.4 of Thompson*/

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/* We obtain the optimal value of gamma using bisection method */

/* This is the function to be integrated on order to get lower bound in Thompson */
/*Increment for the Delta*/

/*Scaling of the parameters*/

/*Integrate, using the Laguerre quadrature, for obtaining the lower bound */
/* Call Price */

Taking the Call price formula from [1].

/* Put Price from Parity*/

Simple calculuous give the call-put parity relationship

$P_{T,t}(K) = C_{T,t}(K) + K * \exp(-r * (T-t)) - S(t) * \exp(-r * (T-t)) * (\exp(-(r-divid) * (T-t)) - 1) * \frac{1}{(T-t)*(r-divid)}$
/*Delta for call option*/

The delta is obtained with finite difference

/*Delta for put option*/

We use again the call-put parity relation

$\Delta_P = \Delta_C - \exp(-r * (T-t)) * (\exp(-(r-divid) * (T-t)) - 1) * \frac{1}{(T-t)*(r-divid)}$
/*Price*/
/*Delta */

References

[1] G.W.P. THOMPSON. Fast narrow bounds on the value of asian options. *Working paper Judge Institute U. of Cambridge*, 1999. 1

[2] L.C.G.ROGERS Z.SHI. The value of an asian option. *J. Appl. Probab.*, 32(4):1077–1088, 1995. 1