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ap_fixedasian_turnbullwakeman

Output parameters:

- Price
- Delta

Description: Fixed Asian options are priced with Turnbull-Wakeman method that gives the Edgeworth expansion around a lognormal distribution using the first four moments of the logarithm of the arithmetic average[2]
/*Scaling of parameters */
/*Computation of the first four moments */

/*Computation of cumulants of the arithmetic average*/

/*Computation of lognormal density and its derivatives*/

/* Fit the parameters meanlog,v of lognormal distribution */

/*Levy Formula*/

Fixed Asian options are priced with Levy method[1]. /*Edgeworth Adjustment : Computation of theoretical moments of the lognormal density*/
/*Edgeworth Adjustment : Computation of theoretical cumulants of the lognormal density*/
/* Call Price */

Taking the Call price formula from [2]

. /* 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*/

Here we derive the formula from [1] with respect to the variable $S(t)$

/*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] E.LEVY. Pricing european average rate currency options. *J.Of International Money and Finance*, 11:474–491, 1992. 1, 2

[2] S.TURNBULL WAKEMAN L. A quick algorithm for pricing european average options. *J.Of Financial and Quantitative Analysis*, 26:377–389, 1991. 1