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ap_fixedasian_fusaitagliani

Output parameters:

- Price
- Delta

Description: Description of the algorithm is given in there.
Fixed Asian options are priced with Fusai-Tagliani method that gives the Edgeworth expansion around a normal distribution using the first four moments of the logarithm of the arithmetic average[1]
/* Computation the double(Mellin+Laplace) transform of the density of arithmetic average */
/* We use the Cauchy Gourat theorem to compute the derivatives of the double(Mellin+Laplace) transform */
/*Use the Abate-Whitt for numerical inversion of the Laplace transform*/

/* We obtain the logarithmic moments of the average */

/*Set parameters for Laplace inversion*/

/* Computation of the first four logarithmic moments*/

/*Computation of the cumulants of the arithmetic average*/

/* Fit the parameters m,var of normal density */

/*Edgeworth Adjustment : Computation of theoretical moments of the normal density*/

/*Edgeworth Adjustment : Computation of theoretical cumulants of the normal density*/
/* Integrate, using the Laguerre quadrature, for obtaining the call price */

/*Integration with to respect to payoff for obtaining the call price and delta */
/*Density construction using Edgeworth Expansion*/

/* 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*/

We use numerical integration

/*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.FUSAI A.TAGLIANI. Accurate valuation of asian options using moments. *International Journal Of Theoretical and Applied Finance*, 2. 1, 2