

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 nor-
mal 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 calculus give the call-put parity relationship

$$P_{T,t}(K) = C_{T,t}(K) + K * \exp(-r * (T - t)) - S(t) * \exp(-r * (T - t)) * (\exp(-(r - \text{divid}) * (T - t)) - 1) * \frac{1}{(T-t)*(r-\text{divid})}$$

/*Delta for call option*/

We use numerical integration

/*Delta for put option*/

We use again the call-put parity relation

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

/*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**