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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 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