One model of risky asset price evolution described by Gaussian martingale

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Consider the model of risky asset price evolution driven by Gaussian martingale

$$S_n = S_0 e^{H_n},$$

where $S_0 > 0$,

$$H_n = \sum_{n=1}^{n} h_n, \quad h_n = \sigma_n \Delta M_n,$$

$$\sigma_n = a_n + e^{-b_n M_{n-1}}.$$

$(a_n)_{n \geq 1}, (b_n)_{n \geq 1}$ are the sequences of positive numbers, $M = (M_n, F_n), \quad n = 0,1,2,\ldots, N,$ is a Gaussian martingale with quadratic characteristic $\langle M \rangle_n = E M_n^2$.

It is proved that this model satisfies some important properties of real financial time series. The optimal in mean square sense forecasting formulas are obtained.

References

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