Exponentially affine martingales

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ABSTRACT

We consider local martingales of exponential form $M = e^X$ or $\mathscr{E}(X)$ where X denotes one component of a multivariate affine process. Using the theory of affine processes as developed by [1] and [2], we give a sufficient and partly necessary criterion for M to be a true martingale. As a first application, we derive a simple sufficient condition for absolute continuity of the laws of two given affine processes. As a second application, we study whether the exponential moments of an affine process solve a generalized Riccati equation. Finally, as a third application, we show how our results can be used in the determination of optimal portfolios for terminal wealth, when prices are modeled by affine stochastic volatility models, as discussed in [3].

Key words: Affine processes, exponential martingale, change of measure, exponential moments, generalized Riccati equation, portfolio optimization, martingale method

References

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