Quantitative Finance > General Finance

Quantum Portfolios of Observables and the Risk Neutral Valuation Model

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(Submitted on 2 Apr 2010)

Quantum Portfolios of quantum algorithms encoded on qbits have recently been reported. In this paper a discussion of the continuous variables version of quantum portfolios is presented. A risk neutral valuation model for options dependent on the measured values of the observables, analogous to the traditional Black-Scholes valuation model, is obtained from the underlying stochastic equations. The quantum algorithms are here encoded on simple harmonic oscillator (SHO) states, and a Fokker-Planck equation for the Glauber P-representation is obtained as a starting point for the analysis. A discussion of the observation of the polarization of a portfolio of qbits is also obtained and the resultant Fokker-Planck equation is used to obtain the risk neutral valuation of the qbit polarization portfolio.

Comments:	8 pages, no figures
Subjects:	**General Finance (q-fin.GN)**
Cite as:	**arXiv:1004.0844v1 [q-fin.GN]**

Submission history

From: Fredrick Michael [view email]
[v1] Fri, 2 Apr 2010 06:14:37 GMT (108kb,D)

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