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| | **abstract** | We propose a new cognitive framework for option price modelling, using quantum neural computation formalism. Briefly, when we apply a classical nonlinear neural-network learning to a linear quantum Schr\"odinger equation, as a result we get a nonlinear Schr\"odinger equation (NLS), performing as a quantum stochastic filter. In this paper, we present a bidirectional quantum associative memory model for the Black--Scholes--like option price evolution, consisting of a pair of coupled NLS equations, one governing the stochastic volatility and the other governing the option price, both self-organizing in an adaptive 'market heat potential', trained by continuous Hebbian learning. This stiff pair of NLS equations is numerically solved using the method of lines with adaptive step-size integrator. Keywords: Option price modelling, Quantum neural computation, nonlinear Schr\"odinger equations, leverage effect, bidirectional associative memory | **abstract** | We propose a new cognitive framework for option price modelling, using quantum neural computation formalism. Briefly, when we apply a classical nonlinear neural-network learning to a linear quantum Schr\"odinger equation, as a result we get a nonlinear Schr\"odinger equation (NLS), performing as a quantum stochastic filter. In this paper, we present a bidirectional quantum associative memory model for the Black--Scholes--like option price evolution, consisting of a pair of coupled NLS equations, one governing the stochastic volatility and the other governing the option price, both self-organizing in an adaptive `market heat potential', trained by continuous Hebbian learning. This stiff pair of NLS equations is numerically solved using the method of lines with adaptive step-size integrator. Keywords: Option price modelling, Quantum neural computation, nonlinear Schr\"odinger equations, leverage effect, bidirectional associative memory | | |
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