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A finite-dimensional quantum model for the stock market

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We present a finite-dimensional version of the quantum model for the stock market proposed in [C. Zhang and L. Huang, A quantum model for the stock market, Physica A 389(2010) 5769]. Our approach is an attempt to make this model consistent with the discrete nature of the stock price and is based on the mathematical formalism used in the case of the quantum systems with finite-dimensional Hilbert space. The rate of return is a discrete variable corresponding to the coordinate in the case of quantum systems, and the operator of the conjugate variable describing the trend of the stock return is defined in terms of the finite Fourier transform. The stock return in equilibrium is described by a finite Gaussian function, and the time evolution of the stock price, directly related to the rate of return, is obtained by numerically solving a Schrodinger type equation.

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