

NEURAL NETWORKS MODELING TEMPORAL VARIATIONS OF THE MARKET STOCK INDEXES AND DYNAMICAL PROPERTIES OF WORLD TRADE WEB

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The purpose of this paper is to carry out an neural networks imitating modeling the dynamical behavior, temporal variations of the market stock indexes (Russia's RTC, MBCB, Germany's Xetra Dax index, PE FTSE Eurofirst 300, Nikkei 225 S&P500 etc.) during the quite long temporal interval (including seven and more years per day, week, month; including the period of global economy crisis 2008 -...). In last years the neural networks modeling can be considered as the powerful tool for studying the evolution properties and temporal dynamics various complex signals series, including financial ones [1]. In our experiments we used the PC complex code "NNW-31MS" [1-3]. The detailed description of this code is presented in ref. [2]. In fact, it is a numerical realization of the optical neural networks on the basis of the photon echo. The numerical realization of the photon echo model neural networks is fulfilled on the basis of the object oriented programming methods. As a system platform it was chosen the operation system Windows 95/NT. The programs are fulfilled on the language of Object Pascal. Carrying out the programs was in the integrated medium Delphi 3.0. The PC code allows to study the chaotic (stochastic) effects in the complex multi-level systems and to carry out the computer simulation experiments on dynamics of neural networks with different input pulses, to study the optimal information possibilities of the photon echo neural network in tasks of the complex signals (financial ones) sensing. In the testing calculations the input signals are modeled by the sin, cos, soliton-like, rectangular pulses. In the real modeling calculation it has been used a case of the noise input signal sequence. We have discovered that for definite value of the additive noise intensity D ($D = 0,0001-0,0040$) the tutoring process of the neural network is very effective and the signal reproduction is an optimal (the optimal value $D = 0,0017$). A coherence of input and output is optimal under definite level of noise. We present the results of the neural networks modeling for dynamical properties of the World Trade Web and temporal variations of the market stock indexes: Germany's Xetra Dax index, PE FTSE Eurofirst 300 one, Nikkei 225 one, S&P500, Russia's RTC, MBCB etc. Especial interest attracts a modeling the market stock indexes behavior and the dynamical properties of the World Trade Web in conditions of the global economical crisis and after crisis period.

Keywords

market stock indexes, World Trade Web dynamical properties, neural networks

References

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