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From the currency rate quotations onto strings and brane world scenarios

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In the paper, we study numerically the projections of the real exchange rate dynamics onto the string-like topology. Our approach is inspired by the contemporary movements in the string theory. The string map of data is defined here by the boundary conditions, characteristic length, real valued and the method of redistribution of information. As a practical matter, this map represents the detrending and data standardization procedure. We introduced maps onto 1-end-point and 2-end-point open strings that satisfy the Dirichlet and Neumann boundary conditions. The questions of the choice of extra-dimensions, symmetries, duality and ways to the partial compactification are discussed. Subsequently, we pass to higher dimensional and more complex objects. The 2D-Brane was suggested which incorporated bid-ask spreads. Polarization by the spread was considered which admitted analyzing arbitrage opportunities on the market where transaction costs are taken into account. The model of the rotating string which naturally yields calculation of angular momentum is suitable for tracking of several currency pairs. The systematic way which allows one suggest more structured maps suitable for a simultaneous study of several currency pairs was analyzed by means of the G\^{a}teaux generalized differential calculus. The effect of the string and brane maps on test data was studied by comparing their mean statistical characteristics. The study revealed notable differences between topologies. We review the dependence on the characteristic string length, mean fluctuations and properties of the intra-string statistics. The study explores the coupling of the string amplitude and volatility.

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