

Potential force observed in market dynamics I– The optimal moving average and the market potential

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We introduce an optimal moving average for the analysis of market prices which makes the residue term an independent random noise. In order to observe the dynamics of the averaged price, we introduce another moving average called the super moving average. Price motions around the super moving average are found to be characterized by central forces with quadratic potentials. For a purely random walk we can observe no potential, while for real data of yen-dollar market we can clearly observe either attractive or repulsive potential. When the potential is repulsive the diffusion of market price is a few times faster than the case of attractive case.