Abstract

Empirical studies on trade by trade data in stock markets reveal that there exists a long memory in trade signs. To explain the long memory in trade signs, we present a mathematical model in which trader can divide their orders into two chunks and a probability distribution of the time lag of divided orders is assumed to decay as an inverse power law of time lag with exponent of $\alpha$. We obtain three types of scaling limit of the signed volume process according to the three cases of the value of $\alpha$, (i) $\alpha < 1$, (ii) $\alpha = 1$, and (iii) $\alpha > 1$. In the case of (i) we show that fractional Brownian motion is obtained in the scaling limit.