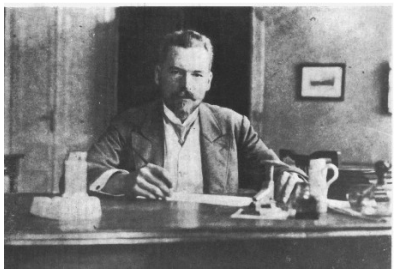

Contribution ID: **50** Type: **Flash talk**

The crucial role of inter-trade times in volatility clustering: a continuous-time random walk description

Wednesday, 29 September 2021 17:55 (5 minutes)

Continuous-time random walk (CTRW) has found many applications in modelling complex systems dynamics, especially physical or socio-economic phenomena [1]. It is also successfully used to describe the behaviour of prices in the stock markets [2]. Spatial jumps represent price increments and inter-trade times are considered as waiting times. One of the most well-known stylized fact about financial time series is activity clustering regardless of intraday seasonality (lunch effect). Our latest results suggest that these dependencies between waiting times are the key element to explain slowly decaying time autocorrelation of the absolute values of price changes [3].

We introduced a CTRW model in which waiting times come from subordinated CTRW. In this subordinated process, the value (waiting time) is randomly selected and lasts for a random period of time. This results in repeating waiting times in our model. In this way, we can introduce power-law step autocorrelation of waiting times. If the mean increment is nonzero, then time autocorrelation of changes decays like a power-law. In the case of strong memory between waiting times, the process has superdiffusion. The exponents of both step and time autocorrelation are the same. Analytical results were compared with empirical data from Polish stock market.

[1] Kutner, R. & Masoliver, J., *The continuous time random walk, still trendy: fifty-year history, state of art and outlook*, Eur. Phys. J. B (2017) 90:50.
[2] Klamut, J. & Gubiec, T., *Directed continuous-time random walk with memory*, Eur. Phys. J. B (2019) 92:69.
[3] Klamut, J. & Gubiec, T., *Continuous Time Random Walk with correlated waiting times. The crucial role of inter-trade times in volatility clustering*, arXiv:1909.04986v2 (2019).

Primary author: KLAMUT, Jarosław (University of Warsaw, Faculty of Physics)

Co-author: GUBIEC, Tomasz (University of Warsaw)

Presenter: KLAMUT, Jarosław (University of Warsaw, Faculty of Physics)

Session Classification: S9