QUASI LIKELIHOOD ANALYSIS AND LIMIT ORDER BOOK MODELING

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The latest financial statistics is going to analysis of ultra high frequency phenomena by modeling mechanisms in a more and more precise time-scale. There is no Brownian motion as a driving process of the system since the central limit theorem is not effective at this level of description, differently from the standard framework. Limit order book (LOB) is demanding such a modeling and then point processes give a promising approach to a description.

The quasi likelihood analysis (QLA) is a systematic analysis of the quasi likelihood random field and the associated estimators, with a large deviation method that provides more precise tail probability estimates for the random field and estimators than those limit distributions give. The QLA is required in prediction theory and model selection.

The point process regression model can express asynchronicity of observations and microstructure, besides nonstationarity and self-exciting/self-correcting effects as well as exogenous effects. A non-ergodic QLA is obtained when the intensities of the point processes become large.

QLA can be developed also in long term asysmptotics. Then establishing ergodicity of point processes becomes an issue.

Non-ergodic QLA can be regarded as a collection of short time scale ergodic QLAs. Local ergodic modeling of LOB is the first step toward global non-ergodic description. AIC is applied to selection of LOB models.

References

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