1085-62-138 **Nakahiro Yoshida*** (nakahiro@ms.u-tokyo.ac.jp). *Limit theorems in statistics for volatility.*
We consider the stochastic integral equation

$$X_t = X_0 + \int_0^t b_s ds + \int_0^t \sigma_s dw_s, \quad t \in [0,1]$$

and discuss parametric/non-parametric estimation for the volatility $\sigma_\cdot$ based on the observations $(X_{t_j})_{j=0,1,\ldots,n}$, $t_j = j/n$.

The quasi likelihood analysis (QLA) is a systematic analysis of the quasi likelihood random field and the associated estimators (quasi MLE, quasi Bayesian estimators), with a large deviation method that derives precise tail probability estimates for the random field and estimators. QLA can be obtained for parametric volatility estimation (Uchida and Y. LeMans2009). The QLA estimators are asymptotically mixed normal and have convergence of moments.

The realized volatility (RV) is a non-parametric estimator of the integrated volatility. The asymptotic mixed normality has been studied for RV and various variations. Asymptotic expansion for RV can be obtained from the martingale expansion in asymptotically mixed normal limit. The expansion formula is expressed by the adjoint of a random symbol with coefficients described by the Malliavin calculus.

Asymptotic expansion of the parametric estimators follows from the martingale expansion and QLA. (Received September 06, 2012)