Nakahiro YOSHIDA (University of Tokyo)

1. N. Yoshida: "Asymptotic behavior of M-estimator and related random field for diffusion process", Annals of the Institute of Statistical Mathematics, **42** (1990) 221–251.

   [The M-estimate which maximizes a positive stochastic process Q is treated for multidimensional diffusion models. The convergence in distribution of the process of ratio of Q's after normalizing is proved. The asymptotic behavior of M-estimates is stated. We present the asymptotic variance in general cases and in estimation by misspecified models.]

2. N. Yoshida: Conditional Fisher information and non-ergodic statistical inference", In: Umegaki, H. and Takahashi, W. (eds) Proceedings of the 13th Symposium on Applied Functional Analysis, (1991) 14–21.

3. N. Yoshida: "Asymptotic expansions of maximum likelihood estimators for small diffusions via the theory of Malliavin-Watanabe", Probab. Theory Related Fields, **92**, (1992) 275-311

   [**yos90-malliavin-statistics.pdf** The asymptotic expansions of the probability distributions of statistics for the small diffusion are derived by means of the Malliavin calculus. From this the second order efficiency of the maximum likelihood estimator is proved. This paper initiated the use of the Malliavin calculus in statistics and this calculus has become an indispensable tool in statistical inference for stochastic differential equations.]

4. N. Yoshida: "Asymptotic expansion for statistics related to small diffusions", J. Japan Statist. Soc. **22**, (1992) 139–159.

   [**yos92-asy_exp_option.pdf** The asymptotic expansion scheme for the problem of pricing options was introduced by this paper. This method makes it quite easy to derive formulas for various financial models even nonlinear, and is nowadays used in many studies in this field as a basic tool.]

5. N. Yoshida: "Estimation for diffusion processes from discrete observation", J. Multivariate Analysis, **41**, (1992) 220–242

   [**yos92.pdf** The maximum likelihood estimation of the unknown parameter of a diffusion process based on an approximate likelihood given by the discrete observation is treated when the diffusion coefficients are unknown and the condition for "rapidly increasing experimental design" is broken. The asymptotic normality of the joint distribution of the maximum likelihood estimator of the unknown parameter in the drift term and an estimator of the diffusion coefficient matrix is proved. We prove the weak convergence of the likelihood ratio random field, which serves to show the asymptotic behavior of the likelihood ratio tests with restrictions.]

6. N. Yoshida: "Asymptotic expansion of Bayes estimators for small diffusions", Probab. Theory Related Fields, **95** (1993) 429–450.

   [**yos93-bayes.pdf** Using the Malliavin calculus we derived asymptotic expansion of the distributions of the Bayes estimators for small diffusions. The second order efficiency of the Bayes estimator is proved.]

7. N. Yoshida: "Asymptotic expansions for perturbed systems on Wiener space: maximum likelihood estimators", J.Multivariate Analysis, **57** (1996) 1–36.

   [**yos96-wiener.pdf** By means of the Malliavin Calculus, we derive asymptotic expansion of the probability distributions of statistics for systems perturbed by small noises. These

results are applied to the problem of the second order asymptotic efficiency of the maximum likelihood estimator.]

8. Y. Sakamoto and N. Yoshida: "Asymptotic expansion of mixture type statistics based on generalized Wiener functionals", J. Multivariate Analysis, **59**, (1996) 34–59.

   [**sakyos-mixture.pdf** By means of the Malliavin calculus, we present an expansion formula for the distribution of a random variable F having a stochastic expansion $F = F_0 + R$, where F_0 is an easily tractable random variable and R is the remainder term. From this result, we derive an expansion of the distribution of the scale mixture sZ of a normal random variable Z by a scale random variables. Applications to shrinkage estimators of the Stein type are mentioned.]

9. N. Yoshida: "Asymptotic expansion of estimators for diffusion with small noises". In: Subba Rao, T. et al. (eds), Applications of time series analysis in astronomy and meteorology. London: Chapman & Hall (1997), 41–44.

10. N. Yoshida: "Malliavin calculus and asymptotic expansion for martingales", Probab. Theory Related Fields, **109** (1997) 301–342.

    [**yos94.pdf** We presented an asymptotic expansion of the distribution of a random variable which admits a stochastic expansion around a continuous martingale. The emphasis is put on the use of the Malliavin calculus; the uniform nondegeneracy of the Malliavin covariance under certain truncation plays an essential role as the Cramér condition did in the case of independent observations. Applications to statistics were presented. This paper solved the distributional (therefore standard) expansion for continuous-times stochastic processes, and hence it gave first the expansion of the distribution of the maximum likelihood estimator as an application of the result.]

11. Y. Sakamoto and N. Yoshida: "Asymptotic expansion of M-estimator over Wiener space", Statistical Inference for Stochastic Processes, **1** (1998) 85–103.

    [**sakyos-M-wiener.pdf** In this paper we consider an M-estimator defined as a solution of a given estimating function. Sufficient conditions of existence of an M-estimator and its stochastic expansion are presented. In the case where the underlying probability space is a Wiener space and the leading term of the stochastic expansion is a martingale, asymptotic expansions of its distribution function are obtained with the aid of Malliavin calculus. Applications to a stationary ergodic diffusion model are also discussed.]

12. N. Yoshida: "Malliavin calculus and statistics". In: Encyclopedia of Statistical Sciences (S. Kotz et al. eds.), Update Volume 3 (1999) 430–435.

13. 阪本雄二, 吉田朋広: "Malliavin 解析と統計的漸近理論", 統計数理, **47** (1999) 175–200.

14. S. Kusuoka and N. Yoshida: "Malliavin calculus, strong mixing, and expansion of diffusion functionals", Prob. Theory Related Fields **116** (2000) 457–484.

    [**kusyos97.pdf** Under geometric mixing condition, we presented asymptotic expansion of the distribution of an additive functional of a Markov or an 0-Markov process with finite autoregression including Markov type semimartingales and time series models with discrete

time parameter. The emphasis is put on the use of the Malliavin calculus in place of the conditional type Cramér condition, whose verification is in most case not easy for continuous time processes without such an infinite dimensional approach. In the second part, by means of the perturbation method and the operational calculus, we proved the geometric mixing property for non-symmetric diffusion processes, and presented a sufficient condition which is easily checked in practice. Accordingly, we obtained asymptotic expansion of diffusion functionals and proved the validity of it under mild conditions, e.g., without the strong contractivity condition. This paper is the first part of the two papers on expansion for continuous-time processes under the mixing condition. The continuation is the author's paper PTRF (2004).]

15. Y. Sakamoto and N. Yoshida: "Asymptotic expansion under degeneracy". J. Japan Stat. Soc. **33**, (2003) 145–156.

    [**deg-jjss2003.pdf** We will consider a stochastic expansion described by random variables whose covariance matrix is asymptotically degenerate. Though the conventional approach with Bhattacharya-Ghosh's transform requires the nondegeneracy of the covariance matrix, it is known that this method still works even in degenerate cases with the help of the so-called global approach. In this paper, we explain this fact and also mention, as an example, the third order asymptotic expansion of the maximum likelihood estimator for the O-U process.]

16. M. Uchida and N. Yoshida: "Information criteria in model selection for mixing processes", Statistical Inference for Stochastic Processes, **4** (2001) 73–98.

    [**uchi-yos01.pdf** We present information criteria for statistical model evaluation problems for stochastic processes. The emphasis is put on the use of the asymptotic expansion of the distribution of an estimator based on the conditional Kullback-Leibler divergence for stochastic processes. Asymptotic properties of information criteria and their improvement are discussed. An application to a diffusion process is presented.]

17. N. Yoshida : "Malliavin calculus and martingale expansion", Bull. Sci. math. **125** (2001) 431–456.

    [**yos-jump-mart.pdf** We proved the validity of the asymptotic expansion for the distribution of a martingale with jumps. A sufficient condition is presented in terms of the decay of certain integrations of Fourier type. In order to estimate such Fourier type integrals, we use the Malliavin calculus of jump type and show that it becomes a key to our program. Expansion for a time series model involving a long-memory component is also discussed.]

18. N. Yoshida: "Conditional expansions and their applications", Stochastic Processes and their Applications **107** (2003) 53–81.

    [**yos03.pdf** This paper formulates a generalized integral that is conceptually corresponding to the generalized expectation of the pull-back of the Schwartz distribution under the functional of a process with jumps. It gives an extension of Watanabe's theory to jump processes. Asymptotic expansion for jump processes is discussed. Lifting the joint convergence of random vectors to the convergence of the conditional law is also discussed.]

19. N. Yoshida: "Malliavin calculus and Statistics". (in Japanese) Sugaku **55** (2003) 225-244.

[Overview of the author's work related to the Malliavin calculus. Only Japanese version is available at present. The English translation is on-going but not yet completed by the translator.]

20. Y. Shimizu and N. Yoshida: "Estimation of parameters for diffusion processes with jumps from discrete observations" (2003), Stat. Inference Stoch. Process. **9** (2006), no. 3, 227–277.

    [**shimizu-yoshida2003.pdf** In this paper, we consider a multidimensional diffusion process with jumps whose jump term is driven by a compound Poisson process. Let $a(x, \theta)$ be a drift coefficient, $b(x, \sigma)$ be a diffusion coefficient respectively, and the jump term is driven by a Poisson random measure p. The aim of this paper is estimating the parameter $\alpha = (\theta, \sigma)$ from some discrete data. http://www.sigmath.es.osaka-u.ac.jp/˜ yasutaka/files/cort-SISP06.pdf]

21. M. Uchida and N. Yoshida : "Asymptotic expansion for small diffusions applied to option pricing. Stat. Inference Stoch. Process. **7** (2004), 189–223.

    [**uchi-yos-option.pdf** Using the Malliavin calculus, we derive asymptotic expansion of the distribution of statistics related to small diffusions. Applications to option pricing in economics are presented.]

22. H. Masuda and N. Yoshida:"An application of the double Edgeworth expansion to a filtering problem", Statistics & Probability Letters **70** (2004) 37–48.

    [**masyos-filtering** In a class of continuous-time filtering models with Gaussian limit, we provide a practical scheme of an approximation of a conditional expectation given finite-dimensional observations, in the light of the double Edgeworth expansion obtained through the Malliavin calculus. Simple and explicit expressions up to the second order are given, so that we can easily write a computer program.]

23. N. Yoshida : "Partial mixing and conditional Edgeworth expansion", Probab. Theory Related Fields **129** (2004) 559–624.

    [**partialmixing.pdf** Introducing a conditional mixing property, Götze and Hipp's theory is generalized to a continuous-time conditional ϵ-Markov process satisfying this property. The Malliavin calculus for jump processes applies to random-coefficient stochastic differential equations with jumps with the aid of the support theorem to verify the non-degeneracy condition, i.e., a conditional type Cramér condition.]

24. Y. Sakamoto and N. Yoshida: "Asymptotic expansion formulas for functionals of epsilon-Markov processes with a mixing property", Annals of the Institute of Statistical Mathematics **56** (2004) 545–597.

    [**sakyos04.pdf** The ϵ-Markov process is a general model of stochastic processes which includes nonlinear time series models, diffusion processes with jumps, and many point processes. With a view to applications to the higher-order statistical inference, we will consider a functional of the ϵ-Markov process admitting a stochastic expansion. Arbitrary order asymptotic expansion of the distribution will be presented under a strong mixing condition. Applying these results, the third order asymptotic expansion of the M-estimator for a general stochastic process will be derived. The Malliavin calculus plays an essential role in this article. We illustrate how to make the Malliavin operator in several concrete examples. We

will also show that the third order expansion formula (Sakamoto and Yoshida (1998, ISM Cooperative Research Report, No. 107, 53-60; 1999, unpublished)) of the maximum likelihood estimator for a diffusion process can be obtained as an example of our result.]

25. M. Uchida and N. Yoshida: "Information criteria for small diffusions via the theory of Malliavin-Watanabe". Statist. Infer. Stochast. Process., **7** (2004) 35–67.

    [**uchiyos04.pdf** Information criteria based on the expected Kullback-Leibler information are presented by means of the asymptotic expansions derived with the Malliavin calculus. We consider the evaluation problem of statistical models for diffusion processes with small noise. The correction terms are essentially different from the ones for ergodic diffusion models presented in the author's previous papers that treated ergodic cases.]

26. Y. Sakamoto,Y., Y. Takada and N. Yoshida: "Expansions of the coverage probabilities of prediction region based on a shrinkage estimator". Statistics **38** (2004) 381–390.

    [**saktakyos.pdf** This paper gives an application of the asymptotic expansion to a problem in the statistical decision theory. An expansion formula for the coverage probability of prediction region based on a shrinkage estimator proposed by Joshi [Joshi, V. M. (1967). Inadmissibility of the usual confidence sets for the mean of a multivariate normal population. Ann. Math. Statist., 38, 1868-1875.] is obtained. Its error bound is evaluated in terms of a function of an unknown parameter. Applying this result, three types of asymptotic expansions are derived. These expansions show inadmissibility of the usual prediction region.]

27. A. Takahashi and N. Yoshida: "An asymptotic expansion scheme for optimal investment problems", Statist. Infer. Stochast. Process. **7** (2004) 153–188.

    [**tak-yos04-optimal.pdf** We proposeed a new computational scheme for the evaluation of the optimal portfolio for investment. Our method is based on an extension of the asymptotic expansion approach which has been developed for pricing problems of the contingent claims' analysis by Yoshida, and Takahashi and Kunitomo. In particular, we will explicitly derive a formula of the optimal portfolio associated with maximizing utility from terminal wealth in a financial market with Markovian coefficients, and give a numerical example for a power utility function.]

28. T. Hayashi and N. Yoshida: "On covariance estimation of nonsynchronously observed diffusion processes". preprint (2003). Bernoulli, 11, 359–379 (2005)

    [**hayyos03.pdf** This paper introduced a nonsynchronous covariation estimator, which is today called the Hayashi-Yoshida estimator. We consider the problem of estimating the covariance of two diffusion processes when they are observed only at discrete times in a non-synchronous manner. The popular approach in the literature by the realized covariance estimator after artificially synchronized data is problematic because it leaves the interval size as a tuning parameter, besides the data interpolation scheme causes estimation bias. We propose a new estimator which is free of any synchronization processing the original data, hence free of bias or other problems caused by it.]

29. H. Masuda and N. Yoshida: "Asymptotic expansion for Barndorff-Nielsen and Shephard's stochastic volatility model", Stochastic Processes and their Applications **115** (2005) 1167–1186.

[**masyos05.pdf** With the help of a general methodology of asymptotic expansions for mixing processes, we obtain the Edgeworth expansion for log-returns of a stock price process in Barndorff-Nielsen and Shephard's stochastic volatility model, in which the latent volatility process is described by a stationary non-Gaussian Ornstein-Uhlenbeck process (OU process) with invariant selfdecomposable distribution on $\mathbf{R}_+$. The present result enables us to simultaneously explain non-Gaussianity for short time-lags as well as approximate Gaussianity for long time-lags. The Malliavin calculus formulated by Bichteler, Gravereaux and Jacod for processes with jumps and the exponential mixing property of the OU process play substantial roles in order to ensure a conditional type Cramér condition under a certain truncation. Owing to several inherent properties of OU processes, the regularity conditions for the expansions can be verified without any difficulty, and the coefficients of the expansions up to any order can be explicitly computed.]

30. A. Takahashi and N. Yoshida: "Monte Carlo simulation with asymptotic method", preprint (2002). J. Japan Statist. Soc. **35** (2005) 171–203.

    [**tak-yos04.pdf** We propose a new computational scheme with the asymptotic method to achieve variance reduction of Monte Carlo simulation for numerical analysis especially in finance. We not only provide general scheme of our method, but also show its effectiveness through numerical examples such as computing optimal portfolio and pricing an average option. Finally, we show mathematical validity of our method. The Malliavin calculus is used.]

31. N. Yoshida: "Polynomial type large deviation inequality and its applications", preprint (2005). Annals of the Institute of Statistical Mathematics (Received: 19 December 2005 / Revised: 15 January 2007 / Published online: 2010)

    [**pld2005.pdf** We prove a certain polynomial type large deviation inequality for a statistical random field. From this result, it is possible to obtain weak convergence of the statistical random field, and asymptotic properties of statistics related to it. We apply those results to quasi-likelihood analysis for sampled stochastic differential equations. It turns out that Yury Kutoyants' scheme to apply Ibragimov-Hasminskii's theory to stochastic processes works for general stochastic differential equations. Certain Bayesian type estimators are proposed and their asymptotic properties are shown as well as those of the quasi-maximum likelihood estimator.]

32. S. Lee, Y. Nishiyama and N. Yoshida: "Test for parameter change in diffusion processes by cusum statistics based on one-step estimators", Research Memorandum 926, The Institute of Statistical Mathematics (2004). Annals of the Institute of Statistical Mathematics, **58** (2006) 211-222

    [**leenisyos06.pdf** In this paper, we consider the problem of testing a parameter change using the cusum test based on one-step estimators in diffusion processes. It is shown that under regularity conditions the cusum test statistic has the limiting distribution of a functional of Brownian bridge.]

33. M. Uchida and N. Yoshida: "Asymptotic expansion and information criteria", SUT J. Math. **42**, (2006) 31–58

[**uchiyos-sut.pdf** For statistical models including continuous time stochastic processes, two types of information criteria based on the expected Kullback-Leibler information are proposed. The information criteria are applied to the evaluation of various types of statistical models and they are generally different from the results proposed in Uchida and Yoshida (Statistical Inference for Stochastic Processes, 4, 73-98 (2001)), which are based on the estimated Kullback-Leibler information. As an example, we present two information criteria for ergodic diffusion processes.]

34. T. Hayashi and N. Yoshida: "Asymptotic normality of nonsynchronous covariance estimators for diffusion processes", Annals of the Institute of Statistical Mathematics, **60** (2008) 367-406 (Received: 4 November 2005 / Revised: 24 May 2006 / Published online: 3 October 2007)

    [**hy-normal-aism08.pdf** We consider the problem of estimating the covariance of two diffusion type processes when they are observed only at discrete times in a nonsynchronous manner. In our previous work in 2003, we proposed a new estimator which is free of any synchronization processing of the original data and showed that it is consistent for the true covariance of the processes as the observation interval shrinks to zero; Hayashi and Yoshida (Bernoulli, 11, 359-379, 2005). This paper is its sequel. Specifically, it establishes asymptotic normality of the estimator in a general nonsynchronous sampling scheme.]

35. S. Iacus, M. Uchida and N. Yoshida: "Parametric estimation for partially hidden diffusion processes sampled at discrete times", preprint (2006), Stochastic Processes and their Applications **119** (2009) 1580–1600 (Received 1 February 2008; received in revised form 28 July 2008; accepted 12 August 2008)

    [**iac-uch-yos06.pdf** For a one-dimensional diffusion process $X = \{X(t); 0 \leq t \leq T\}$, we suppose that $X(t)$ is hidden if it is below some fixed and known threshold τ, but otherwise it is visible. This means a partially hidden diffusion process. The problem treated in this paper is the estimation of a finite-dimensional parameter in both drift and diffusion coefficients under a partially hidden diffusion process obtained by a discrete sampling scheme. It is assumed that the sampling occurs at regularly spaced time intervals of length h_n such that $nh_n = T$. The asymptotic is when $h_n \to 0$, $T \to \infty$ and $nh_n^2 \to 0$ as $n \to \infty$. Consistency and asymptotic normality for estimators of parameters in both drift and diffusion coefficients are proved.]

36. S. Iacus and N. Yoshida: "Estimation for the discretely observed telegraph process", Theory of Probability and Mathematical Statistics **78** (2009) 37–47 (Received 28 DEC 2006 / Article electronically published on August 4, 2009)

    [**iacus-yoshida06.pdf** The telegraph process $X(t), t > 0$ is supposed to be observed at $n+1$ equidistant time points $t_i = i\Delta_n$, $i = 0, 1, ..., n$. The unknown value of λ, the underlying rate of the Poisson process, is a parameter to be estimated. We show that previously proposed moment type estimators are consistent and asymptotically normal but not efficient. We study further an approximated moment type estimator which is still not efficient but comes in explicit form. Finally, we propose a new estimator which is consistent, asymptotically normal and asymptotically efficient under no additional hypotheses.]

37. Y. Sakamoto and N. Yoshida: "Third order asymptotic expansion of M-estimators for diffusion processes", Annals of the Institute of Statistical Mathematics, **61** (2009) 629–661 (Received: 27 December 2004 / Revised: 4 June 2007)

    [**sak-yos-M.pdf** For an unknown parameter in the drift function of a diffusion process, we consider an M-estimator, and obtain its distributional asymptotic expansion up to the third order, based on the Malliavin calculus. Our setting covers the misspecified cases. To represent the coefficients in the asymptotic expansion, we derive some formulas for asymptotic cumulants of stochastic integrals, which are widely applicable to many other problems. Furthermore, asymptotic properties of cumulants of mixing processes will be also studied in a general setting.]

38. Yu. Kutoyants and N. Yoshida: "On moment estimation for diffusion process". Bernoulli **13**, (2007) 933–951. (Received May 2001 and revised January 2007)

    [**kut-yos-moment.pdf** We investigate the moment estimation for an ergodic diffusion process with unknown trend coefficient. We consider nonparametric and parametric estimation. In each case, we present a lower bound for the risk and then construct an asymptotically efficient estimator of the moment type functional or of a parameter which has a one-to-one correspondence to such a functional. Next, we clarify a higher order property of the moment type estimator by the Edgeworth expansion of the distribution function.]

39. T. Hayashi and N. Yoshidsa: "Nonsynchronous covariance estimator and limit theorem II", Research Memorandum No. 1067, 2008, Institute of Statistical Mathematics

    [**ism1067.pdf** An asymptotic distribution theory of the nonsynchronous covariation process for continuous semimartingales (Hayashi and Yoshida (2005b), Hayashi and Yoshida (2006)) is studied. In the setup, two continuous semimartingales are sampled at stopping times, in a nonsynchronous manner. The nonsynchronous covariation is a consistent estimator for the true quadratic covariation of the semimartingales, as the mesh size of the sampling intervals shrinks to zero. In particular, we deal with the case when the limiting variation process of the normalized approximation error is random, which leads to the convergence to mixed normality, or conditional Gaussian martingale. A class of consistent estimators for the asymptotic variation process is proposed based on kernels, which will be useful from a viewpoint of statistical inferences. An example is presented.]

40. T. Hayashi and N. Yoshidsa: "Nonsynchronous covariation process and limit theorems", preprint (2008), submitted.

    [**backwardextension03-rev3-b.pdf** An asymptotic distribution theory of the nonsynchronous covariation process for continuous semimartingales is presented. Two continuous semimartingales are sampled at stopping times in a nonsynchronous manner. Those sampling times possibly depend on the history of the stochastic processes and themselves. The nonsynchronous covariation process converges to the usual quadratic covariation of the semimartingales as the maximum size of the sampling intervals tends to zero. We deal with the case where the limiting variation process of the normalized approximation error is random and prove the convergence to mixed normality, or convergence to a conditional Gaussian martingale. A class of consistent estimators for the asymptotic variation process is proposed

based on kernels, which will be useful for statistical applications to high-frequency data analysis in finance. As an illustrative example, a Poisson sampling scheme with random change point is discussed. The original paper is ism1067.pdf.]

41. A. Dalalyan and N. Yoshida: "Second-order asymptotic expansion for the covariance estimator of two asynchronously observed diffusion processes", arXiv:0804.0676v1 [math.ST] (Submitted on 4 Apr 2008)

    [**dal-yos0804.pdf** In this paper, we study the asymptotic properties of the Hayashi-Yoshida estimator, hereafter HY-estimator, of two diffusion processes when observations are subject to non-synchronicity. Our setup includes random sampling schemes, provided that the observation times are independent of the underlying diffusions. We first derive second-order asymptotic expansions for the distribution of the Hayashi-Yoshida estimator in the case when observed diffusions have no drift. We then focus on the drifted case and carry out a stochastic decomposition of the HY-estimator itself. This decomposition, in conjunction with the evaluation of the Malliavin covariance, leads to a second-order asymptotic expansion of the distribution of the HY-estimator. This result lies in continuity of the consistency and the asymptotic normality results proved by Hayashi and Yoshida. We compute the constants involved in the obtained expansions for the particular case where the sampling scheme is generated by two independent Poisson processes.]

42. Y. Sakamoto and N. Yoshida: "Asymptotic Expansion for Functionals of a Marked Point Process", Communications in Statistics - Theory and Methods, **39**, Issue 8 & 9 (2010), 1449 – 1465. (Received August 4, 2008; Accepted December 1, 2009)

    [**sakyos_marked_point_process.pdf** We consider a functional of a marked point process and derive asymptotic expansion of the distribution. Also, we apply this result to obtain expansion for the M-estimator. A moving average process sampled by a point process and a point process marked by a diffusion process are discussed.]

43. Y. Sakamoto and N. Yoshida: "Asymptotic Expansion for Stochastic Processes: an Overview and Examples", **38** (2008), No. 1 Special Issue Celebration Volume for Akaike, 173–185 (Accepted April 14, 2008)

    [**sak-yos_jjss2008.pdf** The asymptotic expansion method for ε-Markov processes with a mixing property is briefly reviewed. It is illustrated by a point process marked by a diffusion process. As a typical application, the expansion formula for the M-estimator based on ε-Markov data is exhibited.]

Webpage http://www.ms.u-tokyo.ac.jp/~nakahiro/hp-naka.htm