

Pérez-González, A.; Vilar-Fernández, J. M.; González-Manteiga, W.

Nonparametric variance function estimation with missing data. (English) Zbl 1185.62079
J. Multivariate Anal. 101, No. 5, 1123-1142 (2010).

Summary: A fixed design regression model where the errors follow a strictly stationary process is considered. In this model the conditional mean function and the conditional variance function are unknown curves. Correlated errors when observations are missing in the response variable are assumed. Four nonparametric estimators of the conditional variance function based on local polynomial fitting are proposed. Expressions of the asymptotic bias and variance of these estimators are obtained. A simulation study illustrates the behavior of the proposed estimators.

MSC:

62G08 Nonparametric regression and quantile regression
62G20 Asymptotic properties of nonparametric inference
62H12 Estimation in multivariate analysis
62G05 Nonparametric estimation

Keywords:

volatility; local polynomial regression; missing response; correlated errors

Full Text: [DOI](#)

References:

- [1] Carroll, R.; Ruppert, D., Transforming and weighting in regression, (1988), Chapman and Hall New York
- [2] Dette, H.; Munk, A.; Wagner, T., Estimating the variance in nonparametric regression—what is a reasonable choice?, *J. roy. statist. soc. ser. B*, 4, 751-764, (1998) · [Zbl 0944.62041](#)
- [3] Dette, H.; Munk, A.; Wagner, T., A review of variance estimators with extensions to multivariate nonparametric regression models, *Multivariate anal. design experiments survey sampling*, 469-498, (1999) · [Zbl 0946.62056](#)
- [4] Box, G.E.P., Signal-to-noise ratios, performance criteria, and transformations, *Technometrics*, 30, 1-17, (1988)
- [5] Shephard, N., Stochastic volatility: selected readings, (2005), Oxford University Press Oxford · [Zbl 1076.60005](#)
- [6] Rice, J., Bandwidth choice for nonparametric kernel regression, *Ann. statist.*, 12, 1215-1230, (1984) · [Zbl 0554.62035](#)
- [7] Gasser, T.; Sroka, L.; Jennen-Steinmetz, C., Residual variance and residual pattern in nonlinear regression, *Biometrika*, 73, 625-633, (1986) · [Zbl 0649.62035](#)
- [8] Müller, H.G.; Stadtmüller, U., Estimation of heteroscedasticity in regression analysis, *Ann. statist.*, 15, 610-625, (1987) · [Zbl 0632.62040](#)
- [9] Hall, P.; Kay, J.W.; Titterton, D.M., Asymptotically optimal difference-based estimation of variance in nonparametric regression, *Biometrika*, 77, 521-528, (1990) · [Zbl 1377.62102](#)
- [10] Antoniadis, A.; Lavergne, C., ()
- [11] Hall, P.; Carroll, R.J., Variance function estimation in regression: the effect of estimation of the Mean, *J. roy. statist. soc. ser. B*, 51, 3-14, (1989) · [Zbl 0672.62053](#)
- [12] Neumann, M.H., Fully data-driven nonparametric variance estimators, *Statistics*, 25, 189-212, (1994) · [Zbl 0811.62047](#)
- [13] Ruppert, D.; Wand, M.P.; Holst, U.; Hössjer, O., Local polynomial variance-function estimation, *Technometrics*, 39, 3, 262-273, (1997) · [Zbl 0891.62029](#)
- [14] Fan, J.; Yao, Q., Efficient estimation of conditional variance functions in stochastic regression, *Biometrika*, 85, 645-660, (1998) · [Zbl 0918.62065](#)
- [15] Ziegelmann, F.A., Nonparametric estimation of volatility functions: the local exponential estimator, *Econometric theory*, 18, 985-991, (2002) · [Zbl 1109.62358](#)
- [16] Särndal, C.-E.; Lundström, S., Estimation in surveys with non-response, (2005), Wiley Series in Survey Methodology · [Zbl 1079.62012](#)
- [17] Molenberghs, G.; Kenward, M.G., Missing data in clinical studies, (2007), J. Wiley & Sons, Ltd Chichester, UK
- [18] Meng, X.L., Missing data: dial M for ???, *J. amer. statist. assoc.*, 452, 1325-1330, (2000) · [Zbl 1180.62012](#)
- [19] González-Manteiga, W.; Pérez-González, A., Nonparametric Mean estimation with missing data, *Comm. statist. theory meth-*

ods, 2, 277-303, (2004) · [Zbl 1102.62033](#)

- [20] González-Manteiga, W.; Martínez Miranda, M.D.; Pérez-González, A., The choice of smoothing parameter in nonparametric regression through wild bootstrap, *Comput. statist. data anal.*, 47, 487-515, (2004) · [Zbl 1429.62139](#)
- [21] González-Manteiga, W.; Pérez-González, A., Goodness of fit test for linear regression models with missing response data, *Canad. J. statist.*, 1, 149-170, (2006) · [Zbl 1096.62041](#)
- [22] Pérez González, A.; Vilar-Fernández, J.M.; González Manteiga, W., Asymptotic properties polynomial regression missing data and correlated errors, *Ann. inst. statist. math.*, 61, 85-109, (2009) · [Zbl 1294.62087](#)
- [23] Tsiatis, A.A., Semiparametric theory and missing data, () · [Zbl 1105.62002](#)
- [24] Daniels, M.J.; Hogan, J.W., Missing data in longitudinal studies: strategies for Bayesian modeling and sensitivity analysis, (2008), Chapman and Hall · [Zbl 1165.62023](#)
- [25] Longford, N.T., Missing data and small-area estimation: modern analytical equipment for the survey Statistician, (2005), Springer New York · [Zbl 1092.62008](#)
- [26] Fan, J.; Gijbels, I., Local polynomial modelling and its applications, (1996), Chapman and Hall London · [Zbl 0873.62037](#)
- [27] Härdle, W.; Tsybakov, A., Local polynomial estimators of the volatility function in nonparametric autoregression, *J. econometrics*, 81, 223-242, (1997) · [Zbl 0904.62047](#)
- [28] Vilar-Fernández, J.M.; Francisco-Fernández, M., Nonparametric estimation of the conditional variance function with correlated errors, *J. nonparametr. stat.*, 18, 4-6, 375-391, (2006) · [Zbl 1106.62048](#)
- [29] Chu, C.K.; Cheng, P.E., Nonparametric regression estimation with missing data, *J. statist. plann. inference*, 48, 85-99, (1995) · [Zbl 0897.62038](#)
- [30] Little, R.J.A.; Rubin, D.B., Statistical analysis with missing data, (1987), J. Wiley & Sons New York
- [31] Gasser, T.; Müller, H.G.; Mammitzsch, V., Kernels for nonparametric curve estimation, *J. roy. statist. soc. ser. B*, 47, 238-252, (1985) · [Zbl 0574.62042](#)
- [32] Brockwell, P.J.; Davis, R.A., Time series, () · [Zbl 0673.62085](#)
- [33] Wang, L.; Brown, L.; Cai, T.; Levine, M., Effect of Mean on variance function estimation in nonparametric regression, *Ann. statist.*, 36, 646-664, (2008) · [Zbl 1133.62033](#)
- [34] Yu, K.; Jones, M.C., Likelihood-based local linear estimation of the conditional variance function, *J. amer. statist. assoc.*, 99, 139-144, (2004) · [Zbl 1089.62507](#)
- [35] Masry, E., Multivariate local polynomial regression for time series: uniform strong consistency and rates, *J. time ser. anal.*, 17, 571-599, (1996) · [Zbl 0876.62075](#)
- [36] Masry, E., Multivariate regression estimation local polynomial Fitting for time series, *Stochastic process. appl.*, 65, 81-101, (1996) · [Zbl 0889.60039](#)
- [37] Alonso, A.; Sipols, A.E., A time series bootstrap procedure for interpolation intervals, *Comput. statist. data anal.*, 52, 1792-1805, (2008) · [Zbl 1452.62613](#)
- [38] Vilar-Fernández, J.M.; González-Manteiga, W., Resampling for checking linear regression models via non-parametric regression estimation, *Comput. statist. data anal.*, 35, 211-231, (2000) · [Zbl 0967.62025](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.