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**On partial sufficient dimension reduction with applications to partially linear multi-index models.** (English) [Zbl 06158339](#)

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Summary: Partial dimension reduction is a general method to seek informative convex combinations of predictors of primary interest, which includes dimension reduction as its special case when the predictors in the remaining part are constants. In this article, we propose a novel method to conduct partial dimension reduction estimation for predictors of primary interest without assuming that the remaining predictors are categorical. To this end, we first take the dichotomization step such that any existing approach for partial dimension reduction estimation can be employed. Then we take the expectation step to integrate over all the dichotomic predictors to identify the partial central subspace. As an example, we use the partially linear multi-index model to illustrate its applications for semiparametric modeling. Simulations and real data examples are given to illustrate our methodology.

**MSC:**

62 Statistics

**Keywords:**

partial central subspace; partial discretization-expectation estimation; partially linear model

**Full Text:** [DOI](#)

**References:**

- [1] DOI: [10.1198/016214501753208979](#) · [Zbl 1047.62035](#) · doi:[10.1198/016214501753208979](#)
- [2] DOI: [10.1080/01621459.1997.10474001](#) · doi:[10.1080/01621459.1997.10474001](#)
- [3] Chen C. H., *Statistica Sinica* 8 pp 289– (1998)
- [4] Chen X., *The Annals of Statistics* 38 pp 3696– (2010) · [Zbl 1204.62107](#) · doi:[10.1214/10-AOS826](#)
- [5] Chiaromonte F., *The Annals of Statistics* 30 pp 475– (2002) · [Zbl 1012.62036](#) · doi:[10.1214/aos/1021379862](#)
- [6] Cook R. D., *Regression Graphics* (1998) · doi:[10.1002/9780470316931](#)
- [7] Cui X., *The Annals of Statistics* 39 pp 1658– (2011) · [Zbl 1221.62062](#) · doi:[10.1214/10-AOS871](#)
- [8] Härdle W., *Partially Linear Models* (2000) · [Zbl 0968.62006](#) · doi:[10.1007/978-3-642-57700-0](#)
- [9] Harrison D., *Journal of Environmental Economics and Management* 5 pp 81– (1978) · [Zbl 0375.90023](#) · doi:[10.1016/0095-0696\(78\)90006-2](#)
- [10] Li B., *The Annals of Statistics* 31 pp 1636– (2003) · [Zbl 1042.62037](#) · doi:[10.1214/aos/1065705121](#)
- [11] Li B., *The Annals of Statistics* 37 pp 1272– (2009) · [Zbl 1160.62050](#) · doi:[10.1214/08-AOS598](#)
- [12] DOI: [10.1198/016214507000000536](#) · [Zbl 05564427](#) · doi:[10.1198/016214507000000536](#)
- [13] DOI: [10.1198/016214508000000445](#) · [Zbl 1205.62067](#) · doi:[10.1198/016214508000000445](#)
- [14] DOI: [10.1080/01621459.1991.10475035](#) · doi:[10.1080/01621459.1991.10475035](#)
- [15] DOI: [10.1198/jasa.2010.tm09643](#) · [Zbl 1390.62064](#) · doi:[10.1198/jasa.2010.tm09643](#)
- [16] Li L., *Journal of the Royal Statistical Society, Series B* 73 pp 59– (2011) · doi:[10.1111/j.1467-9868.2010.00759.x](#)
- [17] Li Y., *The Annals of Statistics* 35 pp 41– (2007) · [Zbl 1114.62053](#) · doi:[10.1214/009053606000001091](#)
- [18] Pfeiffer R. M., *Biometrical Journal* 50 pp 558– (2008) · doi:[10.1002/bimj.200710428](#)
- [19] Sentürk D., *Scandinavian Journal of Statistics* 32 pp 365– (2005) · [Zbl 1089.62068](#) · doi:[10.1111/j.1467-9469.2005.00450.x](#)
- [20] Serfling R. J., *Approximation Theorems of Mathematical Statistics* (1980) · [Zbl 0538.62002](#) · doi:[10.1002/9780470316481](#)
- [21] Shao Y., *Journal of Statistical Planning and Inference* 139 pp 952– (2009) · [Zbl 1156.62032](#) · doi:[10.1016/j.jspi.2008.06.002](#)
- [22] Stute W., *The Annals of Statistics* 33 pp 1048– (2005) · [Zbl 1080.62023](#) · doi:[10.1214/009053605000000020](#)
- [23] Wang J. L., *The Annals of Statistics* 30 pp 475– (2010)
- [24] Wen X., *Journal of Statistical Planning and Inference* 137 pp 1961– (2007) · [Zbl 1118.62043](#) · doi:[10.1016/j.jspi.2006.05.008](#)

- [25] Xia Y., *Journal of Multivariate Analysis* 97 pp 1162– (2006) · [Zbl 1089.62050](#) · [doi:10.1016/j.jmva.2005.11.005](#)
- [26] Yin X., *Australian and New Zealand Journal of Statistics* 47 pp 141– (2005)
- [27] DOI: [10.1198/016214502388618861](#) · [Zbl 1045.62035](#) · [doi:10.1198/016214502388618861](#)
- [28] Yu Z., *Journal of Multivariate Analysis* 109 pp 61– (2012) · [Zbl 1352.62088](#) · [doi:10.1016/j.jmva.2012.02.004](#)
- [29] Zhou J., *The Annals of Statistics* 36 pp 1649– (2008) · [Zbl 1142.62045](#) · [doi:10.1214/07-AOS529](#)
- [30] Zhu L. P., *Biometrika* 97 pp 295– (2010) · [Zbl 1205.62048](#) · [doi:10.1093/biomet/asq018](#)
- [31] Zhu L. X., *Nonparametric Monte Carlo Tests and Their Applications* (2005) · [Zbl 1094.62058](#)
- [32] Zhu L. X., *The Annals of Statistics* 24 pp 1053– (1996) · [Zbl 0864.62027](#) · [doi:10.1214/aos/1032526955](#)
- [33] DOI: [10.1198/016214505000001285](#) · [Zbl 1119.62331](#) · [doi:10.1198/016214505000001285](#)
- [34] Zhu L. X., *Statistica Sinica* 5 pp 727– (1995)

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