

# Asymptotic theory for varying coefficient regression models with dependent data

Soutir Bandyopadhyay<sup>1</sup> · Arnab Maity<sup>2</sup>

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**Abstract** The varying coefficient models (VCMs) are extremely important tools in the statistical literature and are widely used in many subject areas for data modeling and exploration. In linear VCMs, typically the errors are assumed to be independent. However, in many situations, especially in spatial or spatiotemporal settings, this is not a viable assumption. In this article, we consider nonparametric VCMs with a general dependent error structure which allows for both spatially autoregressive and spatial moving average models as special cases. We investigate asymptotic properties of local polynomial estimators of the model components. Specifically, we show that the estimates of the unknown functions and their derivatives are consistent and asymptotically normally distributed. We show that the rate of convergence and the asymptotic covariance matrix depend on the error dependence structure and we derive the explicit formula for the convergence results.

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✉ Soutir Bandyopadhyay  
sob210@lehigh.edu

Arnab Maity  
amaity@ncsu.edu

<sup>1</sup> Department of Mathematics, Lehigh University, 14 E. Packer Avenue, Bethlehem, PA 18015, USA

<sup>2</sup> Department of Statistics, North Carolina State University, 2311 Stinson Drive, Campus Box 8203, Raleigh, NC 27695, USA

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