

CENTRAL LIMIT THEOREM FOR ASYMMETRIC KERNEL FUNCTIONALS

MARCELO FERNANDES¹ AND PAULO KLINGER MONTEIRO²

¹*Economics Department, Queen Mary, University of London, Mile End Road, London, E1 4NS,
U.K., e-mail: m.fernandes@qmul.ac.uk*

²*Graduate School of Economics, Getulio Vargas Foundation, Praia de Botafogo, 190, 22250-900
Rio de Janeiro, R.J, Brazil, e-mail: pklm@fgv.br*

(Received October 23, 2000; revised May 28, 2004)

Abstract. Asymmetric kernels are quite useful for the estimation of density functions with bounded support. Gamma kernels are designed to handle density functions whose supports are bounded from one end only, whereas beta kernels are particularly convenient for the estimation of density functions with compact support. These asymmetric kernels are nonnegative and free of boundary bias. Moreover, their shape varies according to the location of the data point, thus also changing the amount of smoothing. This paper applies the central limit theorem for degenerate U-statistics to compute the limiting distribution of a class of asymmetric kernel functionals.

Key words and phrases: Asymmetric kernel, beta kernel, boundary bias, central limit theorem, density estimation, gamma kernel, U-statistic theory.