

ESTIMATION OF NONLINEAR AUTOREGRESSIVE MODELS USING DESIGN-ADAPTED WAVELETS*

VÉRONIQUE DELOUILLE¹ AND RAINER VON SACHS²

¹*Solar Physics Department, Royal Observatory of Belgium, Avenue Circulaire 3, B-1180 Brussels, Belgium, e-mail: veronique.delouille@oma.be*

²*Institut de statistique, Université catholique de Louvain, Voie du Roman Pays, 20, B-1348 Louvain-la-Neuve, Belgium, e-mail: vonsachs@stat.ucl.ac.be*

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Abstract. We estimate nonlinear autoregressive models using a design-adapted wavelet estimator. We show two properties of the wavelet transform adapted to an autoregressive design. First, in an asymptotic setup, we derive the order of the threshold that removes all the noise with a probability tending to one asymptotically. Second, with this threshold, we estimate the detail coefficients by soft-thresholding the empirical detail coefficients. We show an upper bound on the l_2 -risk of these soft-thresholded detail coefficients. Finally, we illustrate the behavior of this design-adapted wavelet estimator on simulated and real data sets.

Key words and phrases: Autoregressive design, β -mixing conditions, ARCH models, biorthogonal wavelet transform, l_2 -risk of the wavelet coefficients.

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