

WAVELETS AND PRINCIPAL COMPONENTS REGRESSION

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Abstract: The regression on principal components (PCR) is an applied regression on PCA factors beforehand carried out on initially strongly correlated variables. The use of the PCA it possible to replace the initial variables, by principal components which preserve the quasi-total of information, and which have the advantage of being not correlated. These components are taken as explanatory variables X_i for a multiple linear regression.

The PCR modelling quality (better than that of a simple regression) remains affected by the existence of noise in initial variables.

In this work, we propose a denoising of the data by wavelets (thresholding). This denoising makes possible separation of the signal from the noise without losing information. We test this technique on French stock exchange data. We study profitability in function factors influencing movements of the courses of these titles. We show that the elimination of the noise on the X_i by a soft thresholding based on wavelets improves the quality of adjustment of the regression model (PCR after denoising) as well as forecasts quality.

KEY WORDS: Wavelets, Threshold, PCR, PCA, French stock exchange, Profitability.