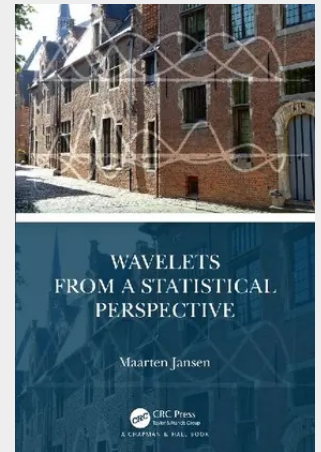


Wavelets from a Statistical Perspective

Wavelets from a Statistical Perspective offers a modern, 2nd generation look on wavelets, far beyond the rigid setting of the equispaced, dyadic wavelets in the early days. With the methods of this book, based on the lifting scheme, researchers can set up a wavelet or another multiresolution analysis adapted to their data, ranging from images to scattered data or other irregularly spaced observations. Whereas classical wavelets stand a bit apart from other nonparametric methods, this book adds a multiscale touch to your spline, kernel or local polynomial smoothing procedure, thereby extending its applicability to nonlinear, nonparametric processing for piecewise smooth data. One of the chapters of the book constructs B-spline wavelets on nonequispaced knots and multiscale local polynomial transforms. In another chapter, the link between wavelets and Fourier analysis, ubiquitous in the classical approach, is explained, but without being inevitable. In further chapters the discrete wavelet transform is contrasted with the continuous version, the nondecimated (or maximal overlap) transform taking an intermediate position. An important principle in designing a wavelet analysis through the lifting scheme is finding the right balance between bias and variance. Bias and variance also play a crucial role in the nonparametric smoothing in a wavelet framework, in finding well working thresholds or other smoothing parameters. The numerous illustrations can be reproduced with the online available, accompanying software. The software and the exercises can also be used as a starting point in the further exploration of the material.



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