Contents

Notations and Abbreviations

List of Symbols

$\langle\cdot,\cdot\rangle$	:	inner product
$\lvert\cdot\rvert$	:	degree of a Laurent polynomial
$\lVert\cdot\rVert$	:	vector norm
$\oplus$	:	direct sum
$\otimes$	:	tensor product
$\triangleright$	:	compression
$\triangleleft$	:	decompression
δ_i	:	Kronecker delta
$\gamma_{j,l}$	:	jth wavelet coefficient at resolution level l
$\lambda_{j,l}$	:	jth scaling function coefficient at resolution level l
$\varphi(x)$	:	(primal) scaling function
$\psi(x)$	:	(primal) wavelet function
$\widetilde{\varphi}(x)$	:	dual scaling function
$\widetilde{\psi}(x)$	:	dual wavelet function
d_i	:	detail signal
g	:	(primal) high-pass filter
h	:	(primal) low-pass filter
$\widetilde{g}$	:	dual high-pass filter
$\widetilde{h}$	:	dual low-pass filter
$\mathbf{L}^2$	:	vector space of square integrable functions in $\mathbf{R}$
$\mathbf{N}$	:	vector space of natural numbers
O	:	big "O" order symbol
$\mathcal{P}(\cdot)$	:	prediction operator
$\mathbf{R}$	:	vector space of real numbers
s_i	:	(coarse representation of a) signal
$\mathcal{U}(\cdot)$	:	update operator
V_j	:	subspace spanned by the (primal) scaling function at resolution level j

W_j	:	subspace spanned by the (primal) wavelet function at resolution level j
$\widetilde{V}_j$	:	subspace spanned by the dual scaling function at resolution level j
$\widetilde{W}_j$	:	subspace spanned by the dual scaling function at resolution level j
X^T	:	transposition of the matrix X
$x(z)$	:	z-transform of the signal or filter x
$\mathbf{Z}$	:	vector space of integer numbers

List of Abbreviations

1D	:	one-dimensional
2D	:	two-dimensional
APOD	:	Approximate Proper Orthogonal Decomposition
CDF	:	Cohen-Daubechies-Feauveau
CPU	:	Central Processing Unit
CWT	:	Continuous Wavelet Transform
DCT	:	Discrete Cosine Transform
DWT	:	Discrete Wavelet Transform
FFT	:	Fast Fourier Transform
FIR	:	Finite Impulse Response
FWT	:	Fast Wavelet Transform
GB	:	Gigabytes
GCV	:	Generalized Cross Validation
GIS	:	Geographical Information Systems
HP	:	high-pass signal
JPEG	:	Joint Photographic Experts Group
KLT	:	Karhunen-Loève Transform
LP	:	low-pass signal
MB	:	Megabytes
PDE	:	Partial Differential Equation
POD	:	Approximate Proper Orthogonal Decomposition
PSNR	:	Peak Signal to Noise Ratio
QMF	:	Quadrature Mirror Filter
RMSE	:	Root Mean Square Error
TB	:	Terabytes
WAILI	:	Wavelets with Integer Lifting
WPT	:	Wavelet Packet Transform

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