HAAR–CHRESTENSON SPECTRA OF DISCRETE SIGNALS[1]

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Haar–Chrestenson bases are wavelet bases considered in a space of discrete N-periodic signals with $N = n^s$, where $n, s \geq 2$. They were introduced and studied in detail in [1]. This talk is devoted to investigation of spectral properties of discrete signals in these bases. Analogous results for Haar bases were obtained in [2–4].

For Haar–Chrestenson basis related with subsampling in frequency, the shift operator is n-adic shift. It is established that shift of a signal leads to shifts in blocks of its spectrum with simultaneous rotation of spectral coefficients in complex plane; convolution and correlation of two signals lead to block-wise convolution and correlation of their spectra, respectively.

For Haar–Chrestenson basis related with subsampling in time, the shift operator is cyclic shift. The result obtained for the spectrum of shift in this case is analogous to that for subsampling in frequency. The results for the spectra of convolution and correlation are more fine: convolution and correlation of two signals lead, respectively, to modified convolution and correlation of corresponding spectral blocks of those signals (the modification consists in rotation of some terms while evaluating the respective sums).

Detailed description of presented results may be found in [5].

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