Viability of a wavelet-based multicarrier modulation ADSL system

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Abstract: The authors consider the viability of a wavelet-based multicarrier modulation (MCM) scheme as an alternative to the current FFT-based system used in an asymmetrical digital subscriber line (ADSL). Current work tends to unfairly compare the performance of wavelet-based MCM to that of the conventional MCM Biorthogonal wavelet bases have a quite different structure from the classical FFT-based harmonic structure. Within each subband in the proposed wavelet-based MCM system, we have essentially a TDM arrangement. Thus a wavelet-based MCM system is practically a combination of orthogonal TDM (between translates) and orthogonal scale division multiplex (OSDM). Unless this particular structure of a future wavelet-based MCM system can be better understood and exploited for appropriate channel equalisation, channel loading and signal demodulation, it is premature and will not be meaningful to compare the performance of a wavelet-based MCM system to that of the current FFT-based system.

Index Keywords: Communication channels (information theory); Demodulation; Fast Fourier transforms; Multicarrier modulation; Time division multiplexing; Wavelet analysis; Asymmetrical digital subscriber line (ADSL); Channel equalization; Channel loading; Harmonic structure; Orthogonal scale division multiplex (OSDM); Signal demodulation; Digital communication systems

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