

Discrete multi-tone (DMT) transceiver with dynamic rate adaptive water-filling bit-loading technique for in-home power line communication networks

Power line based home networking is an emerging technology that allows consumers, using their existing electrical wiring system, to get their computers and other home-electronics devices communicating among themselves, and also share the Internet bandwidth. Discrete multi-tone (DMT), a variant of OFDM, for wired channels is adopted as a multiplexing technique that has the inherent flexibility to adapt the modulation scheme according to the signal-to-noise ratio (SNR) on each subchannel. The power line channel being a slow time variant channel, sub-channel SNRs may change with time, then the bit and energy distribution may need a corresponding change. Such variation in the bit and energy distributions calls for dynamic bit-loading. We propose the application of a dynamic rate adaptive water filling bit-loading technique in order to increase the transmission rate by changing the subchannel bit-loading according to the estimated channel state information