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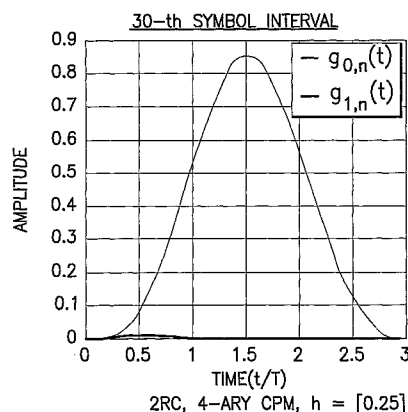
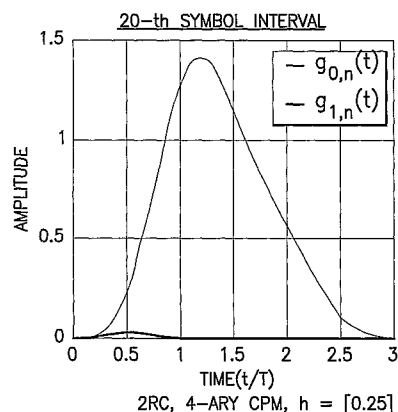
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(54) Title: METHOD AND APPARATUS FOR GENERATING M-ARY CPM WAVEFORMS FROM A SUPERPOSITION OF PAM WAVEFORMS



(57) Abstract: To reflect advantages of a constant phase modulation waveform, the invention provides a pulse amplitude modulated PAM waveform that is a superposition of $Q_0 \leq 2^{L-1}$ PAM component pulses in each symbol interval such that a significant portion of signal energy over each symbol interval is within the Q_0 PAM component pulses. The present invention distributes most signal energy in one pulse and progressively lower energies in the remaining $Q_0 - 1$ pulses of a symbol interval. The Laurent Decomposition is a special case of the present invention, but the present invention exhibits the energy distribution of the Laurent Decomposition in non-binary CPM waveforms and in multi- h (binary and non-binary) CPM waveforms, where h is a modulating index. AU energy is distributed among only $Q = 2^{L-1}$ pulses in each symbol interval, though only $Q_0 < Q$ pulses may in fact be transmitted in certain embodiments. A method, transmitter, receiver, and computer program are disclosed. Embodiments may exactly duplicate a CPM waveform, or approximate a CPM- waveform.

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