

ABSTRACT

An apparatus is provided in a digital communications device for efficiently determining the Hamming distance for trellis based decoders, such as decoders for punctured convolutional codes. The Hamming distance is pre-determined for all codes and stored in program memory. In one version, the device comprises five components including a state sequencing circuit, a Hamming distance table generator, a Hamming distance table, a Hamming distance retrieval circuit, and an ACS circuit. The state sequencer groups all of the possible 2^m possible states into groups of similar branch metrics. The Hamming distance table generator is responsive to the state sequencer and determines the Hamming distance for all combinations of puncture code, received symbol, and transition paths. This may be performed once and stored in permanent memory or performed each time the digital communications device is initialized and stored in a random access memory. The Hamming distance table is a memory arranged as a three dimensional table which stores the results of the Hamming distance table generator. The Hamming distance table receives addresses and data from the Hamming distance table generator. The table may be a permanent memory or a random access memory. The Hamming distance retrieval circuit receives the puncture code and the received symbol and, based on these inputs, retrieves the appropriate information from the Hamming distance table. The ACS circuit is responsive to an output of the Hamming distance table and the state sequencer to output the surviving path metrics for all trellis states corresponding to the received symbol.

