1024-94-111 **Robert A Liebler***, Mathematics Department, Colorado State University, Fort Collins, CO 80523. *Implementing a Gradient Descent Decoding Algorithm for Block Codes.*

There are several critical attributes of a decoding algorithm. The **design complexity** is a measure of the effort required to design and implement the algorithm. The **implementation cost** is a measure of the (time and space) resources required to decode messages once the algorithm is implemented. The **apparent accuracy** of an algorithm is a measure of its ability to actually identify a the nearest codeword to a given message in practice. The **proven accuracy** is a measure of the algorithm's proven ability to correctly move from a received message to its nearest codeword.

We consider only binary block codes on a BSC channel and explore the tradeoff between design complexity and implementation cost requiring only that there be provable accuracy. We present a global "gradient descent" decoding algorithm in which decoding complexity depends on error weight and show that it is possible to construct a (generalized) parity check matrix so that an appropriate gradient function is no more difficult to obtain than the syndrome for a possibly redundantparity check matrix.

Illustration with small examples as well as larger codes based onthe invariant factors of finite projective space incidence maps will be included as time permits. (Received January 04, 2007)